Test Report issued under the responsibility of:

TEST REPORT
IEC 60598-2-3
Luminaires
Part 2: Particular requirements
Section 3: Luminaires for road and street lighting

Report Number. ..... :	CN24XBA1 001
Date of issue ..... :	2024-08-02
Total number of pages ..... :	45 pages
Name of Testing Laboratory preparing the Report ..... :	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
Applicant's name ..... :	MIC Optoelectronic Co.,Ltd
Address ..... :	2nd floor,Third Building, 97# AiNan Road,LongDong, BaoLong Street, LongGang District, Shenzhen, Guangdong, P.R. China
Test specification:	
Standard ..... :	IEC 60598-2-3:2002, IEC 60598-2-3:2002/AMD1:2011 used in conjunction with IEC 60598-1:2020
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
TRF template used ..... :	IECEE OD-2020-F1:2021, Ed.1.4
Test Report Form No. ..... :	IEC60598_2_3M
Test Report Form(s) Originator .... :	Intertek Semko AB
Master TRF ..... :	2021-11-01

This report is not valid as a CB Test Report unless signed by an approved IECEE Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
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Test item description .....:	LED Street Light
Trade Mark(s).....:	MIC
Manufacturer .....:	Same as applicant's name & address
Model/Type reference .....:	See General Product Information.
Ratings .....:	100-277V~, 50/60Hz, Class I, IP66, ta45°C, details see General product information

Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.	
Testing location/ address.....:		101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China	
Tested by (name, function, signature) .....:		Anther Ruan	Anther Ruan
Approved by (name, function, signature)...:		Michael Chen	Michael Chen
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address.....:		N/A	
Tested by (name, function, signature) .....:		N/A	
Approved by (name, function, signature)...:		N/A	
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address.....:		N/A	
Tested by (name + signature) .....:		N/A	
Witnessed by (name, function, signature)..:		N/A	
Approved by (name, function, signature)...:		N/A	
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address.....:		N/A	
Tested by (name, function, signature) .....:		N/A	
Witnessed by (name, function, signature)..:		N/A	
Approved by (name, function, signature)...:		N/A	
Supervised by (name, function, signature) :		N/A	

List of Attachments (including a total number of pages in each attachment):

Attachment 1: EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES. (2 pages)
Attachment 2: LED modules for general lighting - Safety specifications tests according to IEC 62031:2018 and EN IEC 62031: 2020+A11:2021. (24 pages)
Attachment 3: Photo biological safety of lamps and lamp systems were according to standard IEC 62471:2006 and EN 62471:2008. (17 pages)
Attachment 4: IK test according to IEC 62262:2002. (4 pages)
Attachment 5: Photo document. (8 pages)

Summary of testing:

Tests performed (name of test and test clause):

Clause(s)	Test(s)
IEC 60598-1:2020, IEC 60598-2-3:2002/AMD1:2011	
3.5 (3.4)	Rubbing test
3.6 (4.12.1)	Screw torque test
3.6 (4.12.5)	Torque test on screw gland
3.6 (4.13.1)	Impact test
3.6 (4.13.3)	Straight test finger
3.6 (4.14.1)	Test for mechanical suspensions
3.6 (4.14.3)	Adjusting devices
3.6 (4.18)	Resistance to corrosion
3.10 (5.2.10.3)	Pull and torque test on cord anchorage
3.8 (7)	PROVISION FOR EARTHING
3.11 (8.2.5)	Protection against electric shock test
3.11 (8.2.6)	Covers reliably secured
3.11 (8.2.7)	Capacitor discharge
3.13 (9.2)	Tests for ingress of dust, solid objects and moisture
3.13 (9.3)	Humidity test
3.14 (10.2.1)	Insulation resistance test
3.14 (10.2.2)	Electric strength test
3.14 (10.3)	Touch current test and protective conductor current test
3.7 (11)	Creepage distances and clearances
3.12 (12.3)	Endurance test
3.12 (12.4)	Thermal test (normal operation)
3.15 (13.2.1)	Ball pressure test
3.15 (13.3.1)	Needle flame test
3.15 (13.3.2)	Glow-wire test
IEC 60598-2-3:2002+A1:2011	
3.6.3.1	Static load test
3.6.5	Glass cover shattering and high impact resistant glass

Model MSL-F300 with 6500K was selected to perform the Blue light hazard test, it was evaluated as RG1 unlimited according to IEC TR

Testing location:

Shenzhen Southern LCS Compliance Testing Laboratory Ltd.

101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China

62778:2014. Full tests were performed on model MSL-F300, MSL-F150 and MSL-F60 were chosen to perform additional tests.	

Summary of compliance with National Differences (List of countries addressed):

European Group Difference

☒ The product fulfils the requirements of EN 60598-2-3:2003+A1:2011 used in conjunction with EN IEC 60598-1:2021+AMD11:2022.

Use of uncertainty of measurement for decisions on conformity (decision rule) :

☒ No decision rule is specified by the IEC standard, when comparing the measurement result with the applicable limit according to the specification in that standard. The decisions on conformity are made without applying the measurement uncertainty ("simple acceptance" decision rule, previously known as "accuracy method").

☐ Other:… (to be specified, for example when required by the standard or client, or if national accreditation requirements apply)

Information on uncertainty of measurement:

The uncertainties of measurement are calculated by the laboratory based on application of criteria given by OD-5014 for test equipment and application of test methods, decision sheets and operational procedures of IECEE.

IEC Guide 115 provides guidance on the application of measurement uncertainty principles and applying the decision rule when reporting test results within IECEE scheme, noting that the reporting of the measurement uncertainty for measurements is not necessary unless required by the test standard or customer.

Calculations leading to the reported values are on file with the NCB and testing laboratory that conducted the testing.

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

Location: sticking on the external surface of luminaire.

LED Street Light
Model: MSL-F300
100-277V~, 50/60Hz, 300W

CE IP66 t_a 45°C IK08

MIC Optoelectronic Co.,Ltd
2nd floor,Third Building, 97# AiNan Road,LongDong, BaoLong Street, LongGang District, Shenzhen, Guangdong, P.R. China
Importer: xxxxxx Address: xxxxx MADE IN CHINA

Label located on the supply cord:

AC-L: Brown
AC-N: Blue
⏚: Yellow-Green

Notes:

1. Other models are same as above, except model name and rating.
2. The name and address of importer will be marked on the final products.
3. The height of letters and numerals is not less than 2 mm.
4. The height of graphical symbols are not less than 5 mm.
5. The height of WEEE symbol is not less than 7 mm.

Test item particulars ..... :	LED Street Light
Classification of installation and use ..... :	Class I and IP66 for outdoor use only
Supply Connection ..... :	Supply cord
Possible test case verdicts:	
- test case does not apply to the test object .....:	N/A
- test object does meet the requirement .....:	P (Pass)
- test object does not meet the requirement .....:	F (Fail)
Testing .....:	
Date of receipt of test item .....:	2024-06-20
Date (s) of performance of tests .....:	2024-06-20 to 2024-07-30
General remarks:	
"(See Enclosure #)" refers to additional information appended to the report. "(See appended table)" refers to a table appended to the report. **Throughout this report a ☒ comma / ☐ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided..... :	☐ **Yes** ☒ **Not applicable**
When differences exist; they shall be identified in the General product information section.	
Name and address of factory (ies) .....:	Same as applicant's name & address

General product information and other remarks:

Product: LED Street Light
Ratings: 100-277V~, 50/60Hz, Class I, ta=45°C, IP66, IK08(this rating covered by this test report is the luminaire up to the NEMA socket and its short-cap. Device connected to the socket may affect the compliance of the full system and is not covered by this test report), suitable for direct mounting on normally flammable surfaces and for outdoor use only.

1. All models have same appearance and construction, but different size, power and LED driver.
2. All models max. mounting height: 15m.
3. All models use same type LED chip with CCT 2700-6500K.

Model list:

Model No.	Input current	Power	LED quantity	LED driver model No.	Dimension (LxWxH) / Weight	Maximum projected area
MSL-F300	2,5A	300W	192pcs	X6-320M062	793×300×130mm/8,3kg	0,19m^2
MSL-F240	2,0A	240W	160pcs			
MSL-F200	1,67A	200W				
MSL-F180	1,50A	180W	96pcs			
MSL-F150	1,25A	150W		X6E-150M056-G	683×260×130mm/4,48kg	0,14m^2
MSL-F120	1,00A	120W	72pcs			
MSL-F100	0,83A	100W				
MSL-F80	0,67A	80W	48pcs			
MSL-F60	0,50A	60W	32pcs	X6E-075M056-G	568×200×130mm/3,2kg	0,08m^2
MSL-F50	0,42A	50W				
MSL-F25	0,21A	25W				

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.2 (0)	**GENERAL TEST REQUIREMENTS**		P
3.2 (0.3)	More sections applicable ..... :	Yes ☐ No ☒ Section/s:	—
3.2 (0.5)	Components	(see Annex 1)	—
3.2 (0.7)	**Information for luminaire design in light sources standards**		—
3.2 (0.7.2)	Light source safety standard ..... :	IEC 62031:2018 EN IEC 62031: 2020+A11:2021	—
	Luminaire design in the light source safety standard		P
3.4 (2)	**CLASSIFICATION OF LUMINAIRES**		P
3.4 (2.2)	Type of protection ..... :	Class I	P
3.4 (2.3)	Degree of protection ..... :	IP66	
3.4 (2.4)	Luminaire suitable for direct mounting on normally flammable surfaces ..... :	Yes ☒ No ☐	—
3.4 (2.5)	Luminaire for normal use ..... :	Yes ☒ No ☐	—
	Luminaire for rough service ..... :	Yes ☐ No ☒	—
3.4 (-)	Modes of installation of road or street lighting		—
	a) on a pipe	Yes ☐ No ☒	—
	b) on a mast arm	Yes ☒ No ☐	—
	c) on a post top	Yes ☒ No ☐	—
	d) on span or suspension wires	Yes ☐ No ☒	—
	e) on a wall	Yes ☐ No ☒	—
3.5 (3)	**MARKING**		P
3.5 (3.2)	Mandatory markings		P
	Position of the marking		P
	Format of symbols/text		P
3.5 (3.3)	Additional information		P
	Language of instructions	English	P
3.5 (3.3.1)	Combination luminaires		N/A
3.5 (3.3.2)	Nominal frequency in Hz	50/60	P
3.5 (3.3.3)	Operating temperature		N/A
3.5 (3.3.5)	Wiring diagram		N/A
3.5 (3.3.6)	Special conditions		N/A
3.5 (3.3.7)	Metal halide lamp luminaire – warning		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.5 (3.3.8)	Limitation for semi-luminaires		N/A
3.5 (3.3.9)	Power factor and supply current		N/A
3.5 (3.3.10)	Suitability for use indoors		N/A
3.5 (3.3.11)	Luminaires with remote control		N/A
3.5 (3.3.12)	Clip-mounted luminaire – warning		N/A
3.5 (3.3.13)	Specifications of protective shields		N/A
3.5 (3.3.14)	Symbol for nature of supply	~	P
3.5 (3.3.15)	Rated current of socket outlet		N/A
3.5 (3.3.16)	Rough service luminaire		N/A
3.5 (3.3.17)	Mounting instruction for type Y, type Z and some type X attachments	Type Y	P
3.5 (3.3.18)	Non-ordinary luminaires with PVC cable		N/A
3.5 (3.3.19)	Protective conductor current in instruction if applicable		N/A
3.5 (3.3.20)	Provided with information if not intended to be mounted within arm's reach		P
3.5 (3.3.21)	Non replaceable and non-user replaceable light sources information provided	Non-user replaceable light sources	P
3.5 (3.3.22)	Controllable luminaires, classification of insulation provided		N/A
3.5 (3.3.23)	Luminaires without control gear provided with necessary information for selection of appropriate component		N/A
3.5 (3.3.24)	If not supplied with terminal block, information on the packaging		N/A
3.5 (3.3.25)	Luminaires employing light sources emitting UV on mains wiring, information provided		N/A
3.5 (3.3.26)	Wall mounted luminaire using external flexible cable or cord longer than 0.3 m, information provided		N/A
3.5 (3.4)	Test with water	15s	P
	Test with hexane	15s	P
	Legible after test		P
	Label attached		P
3.5 (-)	Additional information in instruction leaflet		P
	a) Design attitude		P
	b) Weight		P
	c) Overall dimensions		P
	d) Maximum projected area if applicable		P
	e) Cross-sectional area of wires if applicable		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	f) Suitability for indoors use		N/A
	g) Dimensions of the compartment		N/A
	h) Torque setting to be applied to bolts or screws		P
	i) Maximum mounting height		P
3.6 (4)	**CONSTRUCTION**		P
3.6 (4.2)	Components replaceable without difficulty		P
3.6 (4.3)	Wireways smooth and free from sharp edges		P
3.6 (4.4)	**Lampholders**		N/A
3.6 (4.4.1)	Integral lampholder		N/A
3.6 (4.4.2)	Wiring connection		N/A
3.6 (4.4.3)	Lampholder for end-to-end mounting		N/A
3.6 (4.4.4)	Positioning		N/A
	- pressure test (N) ..... :		—
	After test the lampholder comply with relevant standard sheets and show no damage		N/A
	After test on single-capped lampholder the lampholder have not moved from its position and show no permanent deformation		N/A
	- bending test (N) ..... :		—
	After test the lampholder have not moved from its position and show no permanent deformation		N/A
3.6 (4.4.5)	Peak pulse voltage		N/A
3.6 (4.4.6)	Centre contact		N/A
3.6 (4.4.7)	Parts in rough service luminaires resistant to tracking		N/A
3.6 (4.4.8)	Lamp connectors		N/A
3.6 (4.4.9)	Caps and bases correctly used		N/A
3.6 (4.4.10)	Light source for lampholder or connection according IEC 60061 not connected another way		N/A
3.6 (4.5)	**Starter holders**		N/A
	Starter holder in luminaires other than class II		N/A
	Starter holder class II construction		N/A
3.6 (4.6)	**Terminal blocks**		N/A
	Tails		N/A
	Unsecured blocks		N/A
3.6 (4.7)	**Terminals and supply connections**		P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.7.1)	Contact to metal parts		P
3.6 (4.7.2)	Test 8 mm live conductor		P
	Test 8 mm earth conductor		P
3.6 (4.7.3)	Terminals for supply conductors		P
3.6 (4.7.3.1)	Welded method and material		N/A
	- stranded or solid conductor		N/A
	- spot welding		N/A
	- welding between wires		N/A
	- Type Z attachment		N/A
	- mechanical test according to 15.6.2		N/A
	- electrical test according to 15.6.3		N/A
	- heat test according to 15.6.3.2.3 and 15.6.3.2.4		N/A
3.6 (4.7.4)	Terminals other than supply connection		N/A
3.6 (4.7.5)	Heat-resistant wiring/sleeves		N/A
3.6 (4.7.6)	Multi-pole plug		N/A
	- test at 30 N		N/A
3.6 (4.8)	**Switches**		N/A
	- adequate rating		N/A
	- adequate fixing		N/A
	- polarized supply		N/A
	- compliance with IEC 61058-1 for electronic switches		N/A
3.6 (4.9)	**Insulating lining and sleeves**		N/A
3.6 (4.9.1)	Retainment		N/A
	Method of fixing ..... :		N/A
3.6 (4.9.2)	Insulated linings and sleeves:		N/A
	Resistant to a temperature > 20 °C to the wire temperature or		N/A
	a) & c) Insulation resistance and electric strength		N/A
	b) Ageing test. Temperature (°C) ..... :		N/A
3.6 (4.10)	**Double or reinforced insulation**		N/A
3.6 (4.10.1)	No contact, mounting surface – accessible metal parts – wiring of basic insulation		N/A
	Safe installation fixed luminaires		N/A
	Capacitors and switches		N/A
3.6 (4.10.2)	Assembly gaps:		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- not coincidental		N/A
	- no straight access with test probe		N/A
3.6 (4.10.3)	Retainment of insulation:		N/A
	- fixed		N/A
	- unable to be replaced; luminaire inoperative		N/A
	- sleeves retained in position		N/A
	- lining in lampholder		N/A
3.6 (4.10.4)	Protective impedance device		N/A
	Basic and supplementary insulation bridged by resistor(s) or appropriate capacitor		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
3.6 (4.11)	**Electrical connections and current-carrying parts**		**P**
3.6 (4.11.1)	Contact pressure		P
3.6 (4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
3.6 (4.11.3)	Screw locking:		P
	- spring washer		P
	- rivets		N/A
3.6 (4.11.4)	Material of current-carrying parts		P
3.6 (4.11.5)	No contact to wood or mounting surface		P
3.6 (4.11.6)	Electro-mechanical contact systems		P
3.6 (4.12)	**Screws and connections (mechanical) and glands**		**P**
3.6 (4.12.1)	Screws not made of soft metal		P
	Screws of insulating material		N/A
	Torque test: torque (Nm); part..... :	Fixed LED driver: 1,2Nm	P
	Torque test: torque (Nm); part..... :	Fixed plastics lens: 0,5Nm	P
	Torque test: torque (Nm); part..... :	Fixed glass cover: 1,2Nm	P
	Torque test: torque (Nm); part..... :	Fixed mounting bracket:8,0Nm	P
	Torque test: torque (Nm); part..... :	Fixed screw terminal: 1,2Nm	P
	Torque test: torque (Nm); part..... :	Fixed earth terminal: 0,5Nm	P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.12.2)	Screws with diameter < 3 mm screwed into metal		P
3.6 (4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm) ..... :		N/A
	- lampholder; torque (Nm) ..... :		N/A
	- push-button switches; torque 0,8 Nm ..... :		N/A
3.6 (4.12.5)	Screwed glands; force (Nm)..... :	Moulded plastic glands: 3,25Nm	P
3.6 (4.13)	**Mechanical strength**		**P**
3.6 (4.13.1)	Impact tests:		P
	- fragile parts; energy (Nm) ..... :		N/A
	- other parts; energy (Nm)..... :	Metal enclosure and glass cover: 0,7Nm	P
	1) live parts		P
	2) linings		N/A
	3) protection		P
	4) covers		P
3.6 (4.13.2)	Metal parts have adequate mechanical strength		P
3.6 (4.13.3)	Straight test finger		P
3.6 (4.13.4)	Rough service luminaires		N/A
	- IP54 or higher		N/A
	a) fixed		N/A
	b) hand-held		N/A
	c) delivered with a stand		N/A
	d) for temporary installations and suitable for mounting on a stand		N/A
3.6 (4.13.6)	Tumbling barrel		N/A
3.6 (4.14)	**Suspensions, fixings and means of adjusting**		**P**
3.6 (4.14.1)	Mechanical load:		P
	A) four times the weight	For model MSL-F300: 4×8,3Kg=33,2Kg	P
	B) torque 2,5 Nm		N/A
	C) bracket arm; bending moment (Nm)..... :		N/A
	D) load track-mounted luminaires		N/A
	E) clip-mounted luminaires, glass-shelve. Thickness (mm) ..... :		N/A
	Metal rod. diameter (mm) ..... :		N/A
	Fixed luminaire or independent control gear without fixing devices		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
3.6 (4.14.2)	Load to flexible cables		N/A
	Mass (kg) ..... :		—
	Stress in conductors (N/mm²) ..... :		N/A
	Mass (kg) of semi-luminaire ..... :		N/A
	Bending moment (Nm) of semi-luminaire ..... :		N/A
3.6 (4.14.3)	Adjusting devices:		P
	- flexing test; number of cycles..... :	45 cycles	P
	- strands broken ..... :	No broken	P
	- electric strength test afterwards		P
3.6 (4.14.4)	Telescopic tubes: cords not fixed to tube; no strain on conductors		N/A
3.6 (4.14.5)	Guide pulleys		N/A
3.6 (4.14.6)	Strain on socket-outlets		N/A
3.6 (4.15)	**Flammable materials**		P
	- glow-wire test 650°C ..... :	See Test Table 3.15 (13.3.2)	P
	- spacing ≥30 mm		N/A
	- screen withstanding test of 13.3.1		N/A
	- screen dimensions		N/A
	- no fiercely burning material		P
	- thermal protection		N/A
	- electronic circuits exempted		N/A
3.6 (4.15.2)	Luminaires made of thermoplastic material with lamp control gear		N/A
	a) construction		N/A
	b) temperature sensing control		N/A
	c) surface temperature		N/A
3.6 (4.16)	**Luminaires for mounting on normally flammable surfaces**		P
	No lamp control gear ..... :	(compliance with Section 12) Electrical controlgear used	N/A
	Provided with adaptor for a track meet the requirements for direct mounting on normally flammable surfaces		N/A
3.6 (4.16.1)	Lamp control gear spacing:		N/A
	- spacing 35 mm		N/A
	- spacing 10 mm		N/A
3.6 (4.16.2)	Thermal protection:		N/A
	- in lamp control gear		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict
	- external		N/A
	- fixed position		N/A
	- temperature marked lamp control gear		N/A
3.6 (4.16.3)	Design to satisfy the test of 12.6	(see clause 12.6)	N/A
3.6 (4.17)	**Drain holes**		N/A
	Clearance at least 5 mm		N/A
3.6 (4.18)	**Resistance to corrosion**		**P**
3.6 (4.18.1)	- rust-resistance		P
3.6 (4.18.2)	- season cracking in copper		N/A
3.6 (4.18.3)	- corrosion of aluminium		P
3.6 (4.19)	Ignitors compatible with ballast		N/A
3.6 (4.20)	Rough service vibration		N/A
3.6 (4.21)	**Protective shield**		N/A
3.6 (4.21.1)	Shield fitted if tungsten halogen lamps or metal halide lamps		N/A
	Shield of glass if tungsten halogen lamps		N/A
3.6 (4.21.2)	Particles from a shattering lamp not impair safety		N/A
3.6 (4.21.3)	No direct path		N/A
3.6 (4.21.4)	Impact test on shield		N/A
	Glow-wire test on lamp compartment..... :	See Test Table 3.15 (13.3.2)	N/A
3.6 (4.22)	Attachments to lamps not cause overheating or damage		N/A
3.6 (4.23)	Semi-luminaires comply Class II		N/A
3.6 (4.24)	**Photobiological hazards**		**P**
3.6 (4.24.1)	No excessive UV radiation if tungsten halogen lamps and metal halide lamps (Annex P)		N/A
3.6 (4.24.2)	Retinal blue light hazard		P
	Class of risk group assessed according to IEC/TR 62778 ..... :	RG1 unlimited	—
	Luminaires with E_{thr} :		N/A
	a) Fixed luminaires		N/A
	- distance x m, borderline between RG1 and RG2 .. :		N/A
	- marking and instruction according 3.2.23		N/A
	b) Portable and handheld luminaires		N/A
	- marking according 3.2.23 if RG1 exceeded at 200 mm according to IEC/TR 62778		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Portable luminaires for children IEC 60598-2-10 and Mains socket outlet nightlights IEC 60598-2-12 not exceed RG1 at 200 mm according to IEC/TR 62778		N/A
3.6 (4.25)	**Mechanical hazard**		**P**
	No sharp point or edges		P
3.6 (4.26)	**Short-circuit protection**		N/A
3.6 (4.26.1)	Adequate means of uninsulated accessible SELV parts		N/A
3.6 (4.26.2)	Short-circuit test with test chain according 4.26.3		N/A
	Supply source ES1 PSE		N/A
	Test chain not melt through		N/A
	Test sample not exceed values of Table 12.1 and 12.2		N/A
3.6 (4.27)	**Terminal blocks with integrated screwless earthing contacts**		N/A
	Test according Annex V		N/A
	Pull test of terminal fixing (20 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Pull test of mechanical connection (50 N)		N/A
	After test, resistance < 0,05 Ω		N/A
	Voltage drop test, resistance < 0,05 Ω		N/A
3.6 (4.28)	**Fixing of thermal sensing control**		N/A
	Not plug-in or easily replaceable type		N/A
	Reliably kept in position		N/A
	No adhesive fixing if UV radiations from a lamp can degrade the fixing		N/A
	Not outside the luminaire enclosure		N/A
	Test of adhesive fixing:		N/A
	Max. temperature on adhesive material (°C) ..... :		—
	100 cycles between t min and t max		N/A
	Temperature sensing control still in position		N/A
3.6 (4.29)	**Luminaires with non-replaceable light source**		N/A
	Not possible to replace light source		N/A
	Live part not accessible after parts have been opened by hand or tools		N/A
3.6 (4.30)	**Luminaires with non-user replaceable light source**		**P**
	If protective cover provide protection against electric shock and marked with “caution, electric shock risk” symbol:		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	At least one fixing means requiring use of tool		P
3.6 (4.31)	**Insulation between circuits**		**P**
	Circuits insulated from LV supply fulfil requirements according 4.31.1 – 4.31.3		P
	Controllable luminaires requiring same level of insulation for all components, the insulation between control terminals and LV supply fulfil requirements according 4.31.1 – 4.31.3		N/A
3.6 (4.31.1)	SELV or PELV circuits		P
	Used SELV/PELV source		P
	Voltage ≤ ELV		P
	Insulating of SELV/PELV circuits from LV supply		P
	Insulating of SELV/PELV circuits from other non SELV/PELV circuits		N/A
	Insulating of SELV/PELV circuits from FELV		N/A
	Insulating of SELV/PELV circuits from other SELV/PELV circuits		N/A
	SELV/PELV circuits insulated from accessible parts according Table X.1		P
	Plugs not able to make any electrical contact with socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Plugs and socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.2)	FELV circuits		N/A
	Used FELV source		N/A
	Voltage ≤ ELV		N/A
	Insulating of FELV circuits from LV supply		N/A
	FELV circuits insulated from accessible parts according Table X.1		N/A
	Plugs not able to make any electrical contact with socket-outlets of other voltage systems		N/A
	Socket outlets does not admit plugs of other voltage systems		N/A
	Socket-outlets does not have protective conductor contact		N/A
3.6 (4.31.3)	Other circuits		N/A
	Other circuits insulated from accessible parts according Table X.1		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Class II construction with equipotential bonding for protection against indirect contacts with live parts:		N/A
	- conductive parts are connected together		N/A
	- test according 7.2.3		N/A
	- conductive part not cause an electric shock in case of an insulation fault		N/A
	- equipotential bonding in master/slave applications		N/A
	- master luminaire provided with terminal for accessible conductive parts of slave luminaires		N/A
	- slave luminaire constructed as class I		N/A
3.6 (4.32)	**Overvoltage protective devices**		N/A
	Comply with IEC 61643-11		N/A
	External to controlgear and connected to earth:		N/A
	- only in fixed luminaires		N/A
	- only connected to protective earth		N/A
3.6 (4.33)	**Luminaire powered via information technology communication cabling**		N/A
	Requirements for Class III luminaire		N/A
	Rated voltage within the range of ES1 and does not exceed maximum voltage of used connector		N/A
	Luminaire does not create any hazard from overvoltage	(see Annex 2)	N/A
3.6 (4.34)	**Electromagnetic fields (EMF)**		P
	No harmful electromagnetic fields	According to clause 4.2.2 of IEC/EN 62493:2015+A1: 2022, this product is a LED light source to comply with the requirement of IEC/EN 62493:2015+A1:2022 and without testing.	P
3.6 (4.35)	**Protection against moving fan blades**		N/A
	Test with a standard test finger		N/A
	Test with test probe acc. to Figure 13 (IEC 61032) for portable luminaire		N/A
	Blades rounded with radius ≥ 0.5 mm and:		N/A
	-hardness less than D60 Shore		N/A
	-peripheral speed less than 15 m/s		N/A
	-input power of fan ≤ 2 W at rated voltage		N/A
3.6 (4.36)	**Track-mounted luminaires**		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Test in accordance with Annex A of IEC60570:2003/AMD2:2019		N/A
3.6.1 (-)	At least IP X3 or X5 respectively. IP ……..:	IP66	P
	Column-integrated luminaires:		N/A
	- parts below 2,5 m. IP .....:		N/A
	- parts above 2,5 m. IP .....:		N/A
3.6.2 (-)	Suspension on span wires		N/A
3.6.3 (-)	Means for attaching the luminaire or external parts to its support appropriate to the weight		P
3.6.3.1 (-)	Static load test		P
	- drag coefficient.....:	1,2	P
	- loaded area (m^2).....:	For model MSL-F300: 0,19 m^2	P
	- used load (N).....:	377,6N	P
	- measured deformation (cm/m) .....:	0	P
	- no rotation		P
3.6.4 (-)	Adjustable lampholders		N/A
3.6.5 (-)	Luminaires installed above 5 m, glass covers shall be:		P
	a) glass that fractures into small pieces (test according to 3.6.5.1), or		P
	b) glass having a high impact shock resistance (test according to 3.6.5.2), or		N/A
	c) protected by any means to retain glass fragments		N/A
	For tunnel luminaires 3.6.5.1 apply		N/A
	Method of protection declared by the manufacturer		N/A
3.6.5.1 (-)	Protection by the use of glass that fractures into small pieces		P
	- number of particles is more than 40.....:	60pcs	P
3.6.5.2 (-)	Protection by the use of high impact resistant glass		N/A
3.6.5.2.1 (-)	Glass covers have high mechanical strength		N/A
	Test according IEC 62262 with test apparatus according IEC 60068-2-75 with impact energy of 5J on preconditioned sample		N/A
3.6.5.2.2 (-)	Glass covers not break into large pieces		N/A
	- test according 3.6.5.1, number of particles is more than 20 .....:		N/A
3.6.6 (-)	Connection compartment of column-integrated luminaire		N/A
	- provides adequate space		N/A
	- means for attachment		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- means for attachment of metal corrosion-resistant		N/A
3.6.7 (-)	Compliance with ISO standard or other .....:		N/A
3.6.8 (-)	Doors of column-integrated luminaires:		N/A
	- corrosion-resistant		N/A
	- opening only possible for an authorized person		N/A
	- impact test 5 Nm		N/A
	- sample show no damage		N/A
3.6.9 (-)	Column-integrated luminaire:		N/A
	- dimension of the cable entry slot (mm) .....:		N/A
	- cable path from the slot to the connection compartment (mm) .....:		N/A
	- cable path free from obstruction that might cause abrasion of the cable		N/A
3.7 (11)	**CREEPAGE DISTANCES AND CLEARANCES**		P
3.7 (11.2)	Creepage distances and clearances..... :	See Table 3.7 (11.2)	P
	Impulse withstand category (Normal category II) (Category III Annex U, Table U.1)	Category II ☒ Category III ☐	—
	Protected against pollution, reduced creepage and clearance according Annex P of IEC 61347-1		N/A
3.7 (11.2.2)	Creepage distances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Creepage distances for frequency over 30 kHz:		N/A
	- Controlgear marked with $\hat{U}_{OUT}$ and f_{UOUT} according IEC 61347-1, clause 7.1, item w	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.7 (11.2.3)	Clearances for frequency up to 30 kHz	See Test Table 3.7 (11.2) I	P
	Clearances distances for frequency over 30 kHz:		N/A
	- Controlgear marked with U_P	See Test Table 3.7 (11.2) II	N/A
	- Requirements according IEC 60664-4 for controlgear not covered by IEC 61347	See Test Table 3.7 (11.2) II	N/A
3.8 (7)	**PROVISION FOR EARTHING**		P
3.8 (7.2.1 + 7.2.3)	Accessible metal parts		P
	Metal parts in contact with supporting surface		P
	Resistance < 0,5 Ω..... :	Max. 0,23Ω < 0,5 Ω	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Self-tapping screws used		N/A
	Thread-forming screws		N/A
	Thread-forming screw used in a grove		N/A
	Protective earth makes contact first		P
	Terminal blocks with integrated screwless protective earthing contacts tested according Annex V		N/A
	Protective earthing of the luminaire not via built-in control gear		P
3.8 (7.2.2 + 7.2.3)	Protective earth continuity in joints, etc.		N/A
3.8 (7.2.4)	Locking of clamping means		P
	Compliance with 4.7.3		P
3.8 (7.2.5)	Protective earth terminal integral part of connector socket		N/A
3.8 (7.2.6)	Protective earth terminal adjacent to mains terminals		P
3.8 (7.2.7)	Electrolytic corrosion of the protective earth terminal		N/A
3.8 (7.2.8)	Material of protective earth terminal		P
	Contact surface bare metal		P
3.8 (7.2.10)	Class II luminaire for looping-in		N/A
	Double or reinforced insulation to functional earth		N/A
3.8 (7.2.11)	Protective earthing core coloured green-yellow		P
	Length of earth conductor		P
3.8 (7.2.12)	PELV circuit connected to protective earth for functional purpose		N/A
3.9 (14)	**SCREW TERMINALS**		N/A
	Separately approved; component list	(see Annex 1)	N/A
	Part of the luminaire	(see Annex 3)	N/A
3.9 (15)	**SCREWLESS TERMINALS AND ELECTRICAL CONNECTIONS**		P
	Separately approved; component list..... :	(see Annex 1)	P
	Part of the luminaire ..... :	(see Annex 4)	N/A
3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		P
3.10 (5.2)	**Supply connection and external wiring**		**P**
3.10 (5.2.1)	Means of connection ..... :	Supply cord	P

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Clause	Requirement + Test	Result - Remark	Verdict
	Outdoor luminaire has not PVC insulated external wiring if not Class III or SELV/PELV circuits ≤ 25 V AC/60 V DC/25 V peak interrupted DC voltage with frequency 10Hz -200 Hz or protected from outdoor environment		N/A
3.10 (5.2.2)	Type of cable ..... :	See Annex 1	P
	Nominal cross-sectional area (mm²) ..... :	See Annex 1	P
	Cables equal to IEC 60227 or IEC 60245		P
3.10 (5.2.3)	Type of attachment, X, Y or Z	Type Y	P
3.10 (5.2.5)	Type Z not connected to screws		N/A
3.10 (5.2.6)	Cable entries:		P
	- suitable for introduction		P
	- adequate degree of protection		P
3.10 (5.2.7)	Cable entries through rigid material have rounded edges		P
3.10 (5.2.8)	Insulating bushings:		N/A
	- suitably fixed		N/A
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- tubes or guards made of insulating material		N/A
3.10 (5.2.9)	Locking of screwed bushings		N/A
3.10 (5.2.10)	Cord anchorage:		P
	- covering protected from abrasion		P
	- clear how to be effective		P
	- no mechanical or thermal stress		P
	- no tying of cables into knots etc.		P
	- insulating material or lining		P
3.10 (5.2.10.1)	Cord anchorage for type X attachment:		N/A
	a) at least one part fixed		N/A
	b) types of cable		N/A
	c) no damaging of the cable		N/A
	d) whole cable can be mounted		N/A
	e) no touching of clamping screws		N/A
	f) metal screw not directly on cable		N/A
	g) replacement without special tool		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	Glands not used as anchorage		N/A
	Labyrinth type anchorages		N/A
3.10 (5.2.10.2)	Adequate cord anchorage for type Y and type Z attachment		P
3.10 (5.2.10.3)	Tests:		P
	- impossible to push cable; unsafe		P
	- pull test: 25 times; pull (N) ..... :	60	P
	- torque test: torque (Nm) ..... :	0,25	P
	- displacement ≤ 2 mm	0,5mm	P
	- no movement of conductors		P
	- no damage of cable or cord		P
	- function independent of electrical connection		P
3.10 (5.2.10.4)	Luminaire with/designed for use with supply cord with maximum current of 2A:		N/A
	- Ordinary Class III luminaire supplied with SELV ≤ 25V RMS/60V DC		N/A
	- Ordinary Class III luminaire supplied with PELV ≤12V RMS/30V DC		N/A
	- Other than ordinary Class III luminaire supplied with voltage ≤12V RMS/30V DC		N/A
	Pull test of 30N		N/A
3.10 (5.2.11)	External wiring passing into luminaire		P
3.10 (5.2.12)	Looping-in terminals		N/A
3.10 (5.2.13)	Wire ends not tinned		P
	Wire ends tinned: no cold flow		N/A
3.10 (5.2.14)	Mains plug same protection		N/A
	Class III luminaire plug		N/A
	No unsafe compatibility		N/A
3.10 (5.2.15)	Connectors for Class III luminaires (IEC 60603 or IEC 62680)		N/A
3.10 (5.2.16)	Appliance inlets (IEC 60320)		N/A
	Installation couplers (IEC 61535)		N/A
	Appliance inlet or connector systems (IEC 61984)		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.10 (5.2.17)	No standardized interconnecting cables properly assembled		N/A
3.10 (5.2.18)	Used plug in accordance with		N/A
	- IEC 60083		N/A
	- other standard		N/A
3.10 (5.3)	**Internal wiring**		P
3.10 (5.3.1)	Internal wiring of suitable size and type		P
	Through wiring		N/A
	- not delivered/ mounting instruction		N/A
	- factory assembled		N/A
	- socket outlet loaded (A) ..... :		N/A
	- temperatures ..... :	(see Annex 2)	N/A
	Green-yellow for protective earth only		P
3.10 (5.3.1.1)	Internal wiring connected directly to fixed wiring		P
	Cross-sectional area (mm²)..... :	See annex 1	P
	Insulation thickness		P
	Extra insulation added where necessary		N/A
3.10 (5.3.1.2)	Internal wiring connected to fixed wiring via internal current-limiting device		P
	Cross-sectional area (mm²)..... :	See annex 1	P
3.10 (5.3.1.3)	Double or reinforced insulation for class II		N/A
3.10 (5.3.1.4)	Conductors without insulation		N/A
3.10 (5.3.1.5)	SELV/PELV current-carrying parts		P
3.10 (5.3.1.6)	Insulation thickness other than PVC or rubber		N/A
3.10 (5.3.2)	Sharp edges etc.		P
	No moving parts of switches etc.		N/A
	Joints, raising/lowering devices		N/A
	Telescopic tubes etc.		N/A
	No twisting over 360°		P
3.10 (5.3.3)	Insulating bushings:		N/A
	- suitable fixed		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- material in bushings		N/A
	- material not likely to deteriorate		N/A
	- cables with protective sheath		N/A
3.10 (5.3.4)	Joints and junctions effectively insulated		N/A
3.10 (5.3.5)	Strain on internal wiring		N/A
3.10 (5.3.6)	Wire carriers		N/A
3.10 (5.3.7)	Wire ends not tinned		N/A
	Wire ends tinned: no cold flow		P
3.10 (5.4)	**Test to determine suitability of conductors having a reduced cross-sectional area**		N/A
	Under test the temperature of the luminaire wiring insulation not exceed the limits stated in Table 12.2	(see Annex 2)	N/A
	No damage to luminaire wiring after test		N/A
3.10.1 (-)	Cord anchorage if applicable		P
	- pull test: 25 times; pull (N) .....:	60	P
	- torque test: torque (Nm) .....:	0,25	P
3.11 (8)	**PROTECTION AGAINST ELECTRIC SHOCK**		P
3.11 (8.2.1)	Live parts not accessible		P
	Basic insulated parts not used on the outer surface without appropriate protection		P
	Basic insulated parts not accessible with standard test finger on portable, settable and adjustable luminaires		P
	Basic insulated parts not accessible with Ø 50 mm probe from outside, other types of luminaires		N/A
	Lamp and starterholders in portable and adjustable luminaires comply with double or reinforced insulation requirements		N/A
	Basic insulation only accessible under lamp or starter replacement		N/A
	Protection in any position		P
	Double-ended tungsten filament lamp		N/A
	Insulation lacquer not reliable		P
	Double-ended high pressure discharge lamp		N/A
	Relevant warning according to 3.2.18 fitted to the luminaire		N/A
3.11 (8.2.2)	Portable luminaire adjusted in most unfavourable position		N/A

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Clause	Requirement + Test	Result - Remark	Verdict
3.11 (8.2.3.a)	Class II luminaire:		N/A
	- basic insulated metal parts not accessible during starter or lamp replacement		N/A
	- basic insulation not accessible other than during starter or lamp replacement		N/A
	- glass protective shields not used as supplementary insulation		N/A
3.11 (8.2.3.b)	BC lamp holder of metal in class I luminaires shall be connected to protective earth		N/A
3.11 (8.2.3.c)	SELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :		N/A
	- voltage under load/ no-load DC (V)……...:		N/A
	- interrupted DC voltage (V) …….:		N/A
	- touch current if applicable (mA) ..... :		N/A
	One conductive part insulated if required		N/A
	Other than ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :		N/A
	- voltage under load/ no-load DC (V)……...:		N/A
	- interrupted DC voltage (V) …….:		N/A
	Class III luminaire only for connection to SELV		N/A
	Class III luminaire not provided with means for protective earthing		N/A
3.11 (8.2.3.d)	PELV circuits with exposed current carrying parts:		N/A
	Ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :		N/A
	- voltage under load/ no-load DC (V)……...:		N/A
	Other than ordinary luminaire:		N/A
	- voltage under load/ no-load AC (V)..... :		N/A
	- voltage under load/ no-load DC (V)……...:		N/A
	One pole insulated if required		N/A
3.11 (8.2.4)	Portable luminaire have protection independent of supporting surface		N/A
3.11 (8.2.5)	Compliance with the standard test finger or relevant probe		P

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Clause	Requirement + Test	Result - Remark	Verdict
3.11 (8.2.6)	Covers reliably secured		P
3.11 (8.2.7)	Luminaire other than below with capacitor > 0,5 μF not exceed 50 V 1 min after disconnection	0V after 1 min	P
	Portable luminaire with capacitor > 0,1 μF (0.25) not exceed 34 V 1 s after disconnection		N/A
	Other luminaires with capacitor > 0,1 μF (0.25) with plug and track adaptors not exceed 60 V 5 s after disconnection		N/A
3.12 (12)	**ENDURANCE TEST AND THERMAL TEST**		P
3.12 (-)	If IP > IP 20 relevant test of (12.4), (12.5), (12.6) and (12.7) after (9.2) before (9.3) as specified in 3.13		—
3.12 (12.2)	**Selection of lamps and ballasts**		**—**
	Lamp used according Annex B	(Lamp used see Annex 2)	—
	Control gear if separate and not supplied	(Control gear used see Annex 2)	—
3.12 (12.3)	**Endurance test:**		P
	a) mounting-position ..... :	According to manual instruction	—
	b) test temperature (°C) ..... :	55	—
	c) total duration (h) ..... :	240	—
	d) supply voltage (V) ..... :	1,1 x 277V	—
	d) if not equipped with control gear, constant voltage/current (V) or (A) ..... :	--	—
3.12 (12.3.1d)	d) Class III luminaires powered via information technology communication cable:		N/A
	- voltage under normal operation (V)……...:		—
	- voltage under abnormal operation (V)……..:		—
	e) luminaire ceases to operate		—
	f) luminaire with constant light output function		N/A
3.12 (12.3.2)	After endurance test:		P
	- no part unserviceable		P
	- luminaire not unsafe		P
	- no damage to track system		N/A
	- marking legible		P
	- no cracks, deformation etc.		P
3.12 (12.4)	**Thermal test (normal operation)**	(see Annex 2)	P

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Clause	Requirement + Test	Result - Remark	Verdict
3.12 (12.5)	**Thermal test (abnormal operation)**	(see Annex 2)	N/A
3.12 (12.6)	**Thermal test (failed lamp control gear condition):**		N/A
3.12 (12.6.1)	Through wiring or looping-in wiring loaded by a current of (A) ..... :		—
	- case of abnormal conditions ..... :		—
	- electronic lamp control gear		N/A
	- measured winding temperature (°C): at 1,1 Un .... :		—
	- measured mounting surface temperature (°C) at 1,1 Un ..... :		N/A
	- calculated mounting surface temperature (°C) ..... :		N/A
	- track-mounted luminaires		N/A
3.12 (12.6.2)	Temperature sensing control		N/A
	- case of abnormal conditions ..... :		—
	- thermal link		N/A
	- manual reset cut-out		N/A
	- auto reset cut-out		N/A
	- measured mounting surface temperature (°C) ..... :		N/A
	- track-mounted luminaires		N/A
3.12 (12.7)	**Thermal test (failed lamp control gear in plastic luminaires):**		N/A
3.12 (12.7.1)	Luminaire without temperature sensing control		N/A
3.12 (12.7.1.1)	Luminaire with fluorescent lamp ≤ 70W		N/A
	Test method 12.7.1.1 or Annex W ..... :		—
	Test according to 12.7.1.1:		N/A
	- case of abnormal conditions ..... :		—
	- Ballast failure at supply voltage (V) ..... :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
	Test according to Annex W:		N/A
	- case of abnormal conditions ..... :		—
	- measured winding temperature (°C): at 1,1 Un ..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un ..... :		—
	- calculated temperature of fixing point/exposed part (°C) ..... :		—

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Clause	Requirement + Test	Result - Remark	Verdict
	Ball-pressure test .....:	See Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.2)	Luminaire with discharge lamp, fluorescent lamp > 70W, transformer > 10 VA		N/A
	- case of abnormal conditions ..... :		—
	- measured winding temperature (°C): at 1,1 Un ..... :		—
	- measured temperature of fixing point/exposed part (°C): at 1,1 Un ..... :		—
	- calculated temperature of fixing point/exposed part (°C) ..... :		—
	Ball-pressure test ..... :	See Table 3.15 (13.2.1)	N/A
3.12 (12.7.1.3)	Luminaire with short circuit proof transformers ≤ 10 VA		N/A
	- case of abnormal conditions ..... :		—
	- Components retained in place after the test		N/A
	- Test with standard test finger after the test		N/A
3.12 (12.7.2)	Luminaire with temperature sensing control		N/A
	- thermal link..... :	Yes ☐ No ☐	—
	- manual reset cut-out ..... :	Yes ☐ No ☐	—
	- auto reset cut-out ..... :	Yes ☐ No ☐	—
	- case of abnormal conditions ..... :		—
	- highest measured temperature of fixing point/ exposed part (°C): ..... :		—
	Ball-pressure test: ..... :	See Table 3.15 (13.2.1)	N/A
3.12.1 (-)	Temperature reduction if for outdoor use only		N/A
3.12.2 (-)	(See above)		—
3.12.3 (-)	Glass covers used within the thermal limits declared by the glass manufacturer		P

3.13 (9)	**RESISTANCE TO DUST AND MOISTURE**		P
3.13.1 (-)	If IP > IP 20 the order of tests as specified in clause 3.12		P
3.13 (9.2)	Tests for ingress of dust, solid objects and moisture:		P
	- classification according to IP..... :	IP66	—
	- mounting position during test ..... :	According to manual instruction	—
	- fixing screws tightened; torque (Nm) ..... :	Fixed glass cover: 0,8Nm Plastic glands: 2,17Nm	—
	- tests according to clauses..... :	Clauses 9.2.2 and 9.2.7	—

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Clause	Requirement + Test	Result - Remark	Verdict
	- electric strength test afterwards		P
	a) no deposit in dust-proof luminaire		N/A
	b) no talcum in dust-tight luminaire		P
	c) no trace of water on current-carrying parts or on insulation where it could become a hazard		P
	c.1) For luminaires without drain holes – no water entry		P
	c.2) For luminaires with drain holes – no hazardous water entry		N/A
	d) no water in watertight, pressure watertight, high pressure and temperature water jet-proof or high pressure and cold water jet-proof luminaire		N/A
	e) no contact with live parts (IP 2X)		N/A
	e) no entry into enclosure (IP 3X and IP 4X)		N/A
	e) no contact with live parts through drain holes and ventilation slots (IP3X and IP4X)		N/A
	f) no trace of water on part of lamp requiring protection from splashing water		N/A
	g) no damage of protective shield or glass envelope		P
3.13 (9.3)	Humidity test 48 h	25°C, 93%Rh	P
3.14 (10)	**INSULATION RESISTANCE AND ELECTRIC STRENGTH**		P
3.14 (10.2.1)	Insulation resistance test		P
	Cable or cord covered by metal foil or replaced by a metal rod of mm Ø ..... :	Covered by metal foil	—
	Insulation resistance (MΩ) ..... :	See below	—
	SELV/PELV:		P
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface..... :	100 MΩ > 1 MΩ	P
	- between current-carrying parts and metal parts of the luminaire..... :	100 MΩ > 1 MΩ	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 ..... :		N/A
	Other than SELV/PELV:		P
	- between live parts of different polarity ..... :	Approved in LED driver	N/A

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Clause	Requirement + Test	Result - Remark	Verdict
	- between live parts and mounting surface ..... :	Between L/N and mounting surface: 100 MΩ > 2 MΩ	P
	- between live parts and metal parts ..... :	Between L/N and metal parts: 100 MΩ > 2 MΩ	P
	- between live parts of different polarity through action of a switch..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
3.14 (10.2.2)	Electric strength test		P
	Dummy lamp		N/A
	Luminaires with ignitors after 24 h test		N/A
	Luminaires with manual ignitors		N/A
	Test voltage (V) ..... :	See below	P
	SELV/PELV:		P
	- between current-carrying parts of different polarity :		N/A
	- between current-carrying parts and mounting surface..... :	500V	P
	- between current-carrying parts and metal parts of the luminaire..... :	500V	P
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
	Other than SELV/PELV:		P
	- between live parts of different polarity ..... :	Approved in LED driver	N/A
	- between live parts and mounting surface ..... :	Between L/N and mounting surface: 1554V	P
	- between live parts and metal parts ..... :	Between L/N and metal parts: 1554V	P
	- between live parts of different polarity through action of a switch..... :		N/A
	- between the outer surface of a flexible cord or cable where it is clamped in a cord anchorage and accessible metal parts..... :		N/A
	- Insulation bushings as described in Section 5 .....:		N/A
3.14 (10.3)	Touch current (mA)……:		N/A
	Protective conductor current (mA)..……:	0,3mA < 3,5mA	P

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.15 (13)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		P
3.15 (13.2.1)	Ball-pressure test .....:	See Test Table 3.15 (13.2.1)	P
3.15 (13.3.1)	Needle-flame test (10 s) .....:	See Test Table 3.15 (13.3.1)	P
3.15 (13.3.2)	Glow-wire test (650°C) .....:	See Test Table 3.15 (13.3.2)	P
3.15 (13.4)	Proof tracking test (IEC 60112) .....:	See Test Table 3.15 (13.4)	N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.7 (11.2)	**TABLE I: Creepage distances and clearances**							P
	Minimum distances (mm) for a.c. up to 30 kHz sinusoidal voltages							P
	Applicable part of IEC 60598-1 Table 11.1.A*, 11.1.B* and 11.2*							P
	Insulation type **	**Measured clearance**	**Required**		**Measured creepage**	**Required**		
			clearance	***Table**		**creepage**	***Table**	
Distance 1:	B	1,7	0,8	11.1.B	1,7	1,4	11.1.A	
Working voltage (V) .....:					Max.80VDC			—
PTI .....:					< 600 ☒ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:					--			—
Supplementary information: Between trace of LED board and accessible metal parts/screws fixed LED module.								
Distance 2:	B	11	1,5	11.1.B	11	2,5	11.1.A	
Working voltage (V) .....:					277V			—
PTI .....:					< 600 ☒ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:					--			—
Supplementary information: Between live part and accessible metal parts by screwless terminal (black)/ mounting surface.								
Distance 3:	--	--	--	--	--	--	--	
Working voltage (V) .....:					--			—
PTI .....:					< 600 ☐ ≥ 600 ☐			—
Pulse voltage or U_P if applicable (kV) .....:					--			—
Supplementary information: --								

** Insulation type: B – Basic; S – Supplementary; R – Reinforced. See also IEC 60598-1 Annex M.

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

3.7 (11.2)	**TABLE II: Creepage distances and clearances**						**N/A**
Minimum distances (mm) for a.c. higher than 30 kHz sinusoidal voltages							
Applicable part of IEC 61347-1 Table 7 and 8* or IEC 60664-4 Table 1 and 2							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**
Distance 1:	--	--	--	--	--	--	--
Working voltage (V) .....:					--		—
Frequency if applicable (kHz) .....:					--		—
PTI .....:					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:					--		—
Supplementary information: --							
Distance 2:	--	--	--	--	--	--	--
Working voltage (V) .....:					--		—
Frequency if applicable (kHz) .....:					--		—
PTI .....:					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:					--		—
Supplementary information: --							
Distance 3:	--	--	--	--	--	--	--
Working voltage (V) .....:					--		—
Frequency if applicable (kHz) .....:					--		—
PTI .....:					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) .....:					--		—
Supplementary information: --							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced.

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Clause	Requirement + Test	Result - Remark	Verdict

3.15 (13.2.1)	TABLE: Ball Pressure Test of Thermoplastics		P
Allowed impression diameter (mm) ..... :		2	—

Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)
LED lens	See Annex 1	121	0,9
Shorting cap	See Annex 1	125	0,7

Supplementary information:

3.15 (13.3.1)	TABLE: Needle-flame test				P
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
Coupler terminal	See Annex 1	10	No	0	Pass
Screwless terminal	See Annex 1	10	No	0	Pass
Class-end connector	See Annex 1	10	No	0	Pass
NEMA socket and its Shorting cap	See Annex 1	10	No	0	Pass

Supplementary information:

3.15 (13.3.2)	TABLE: Resistance to heat and fire - Glow wire tests						P
Object/ Part No./ Material	**Manufacturer/ trademark**	**Glow wire test (°C)**					**Verdict**
		650		**750**		**850**	
		te	**ti**	**te**	**ti**		
LED lens	See Annex 1	0	0	--	--	--	Pass
Reflector	See Annex 1	0	0	--	--	--	Pass
Shorting cap	See Annex 1	0	0	--	--	--	Pass
Ignition of the specified layer placed underneath the test specimen (Yes/No)..... :							No
Supplementary information:							

3.15 (13.4)	TABLE: Proof tracking test	N/A
Test voltage PTI ..... :	175 V	—

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Clause	Requirement + Test	Result - Remark	Verdict

Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
--	--	--	--	--	--
Supplementary information:					

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 1	TABLE: Critical components information					P
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
Supply cord	B	Dong Guan Recheer Electric Wire & Cable Co., Ltd.	H05RN-F	300/500V; 3×1,0mm^2	EN 50525-2-21:2011	VDE 40015173
Input wire of LED driver	B	Guangdong Rifeng Electrical Cable Co., Ltd.	H05RN-F	300/500V; 3x1,0mm^2	EN 50525-2-21:2011	VDE 40015999
Output wire of LED driver	B	Guangdong Rifeng Electrical Cable Co., Ltd.	H05RN-F	300/500V; 2x1,0mm^2	EN 50525-2-21:2011	VDE 40015999
Dimming wire of LED driver	B	Yong Hao Electrical Industry Co., Ltd.	H03VV-F	300/300V, 2x0,5mm^2	EN 50525-2-21:2011	VDE 40027125
Earth wire	C	KUNSHAN XINGHONGM ENG ELECTRONIC CO LTD	1015	300V; 20AWG; 105°C	EN 60598-2-3 EN IEC 60598-1	UL E315421 Tested with appliance
Input wire of NEMA socket	C	DONG GUAN SHENG PAI ELECTRIC WIRE & CABLE CO LTD	3239	Min 20AWG, 60000Vdc, 105°C	IEC 60598-2-3:2002 IEC 60598-2-3:2002/AMD1:2011 IEC 60598-1:2020	UL E347603 Tested with appliance
Coupler terminal	B	Ningbo Jinwei Electrical Technology Co., Ltd.	JN002(female part); JN002(male part)	400V, 16A	EN 61984:2009	VDE 40038746
Screwless terminal	B	WAGO KONTAKTTECHNIK GMBH & CO. KG	222-412	0,2 to 2,5mm^2/400V, 24A	EN 60998-1:2004 EN 60998-2-2:2004	UL Certificate: ENEC-01360
Class-end connector	C	HEAVY POWER CO LTD	CE2	PC	IEC 60598-2-3:2002 IEC 60598-2-3:2002/AMD1:2011 IEC 60598-1:2020	UL EE113650 Tested with appliance

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

Heat-shrinkable tubing for Class-end connector	C	DEEM Electronic & Electric Material Co., LTD	DM-D31/D41	600V, 125°C	IEC 60598-2-3:2002 IEC 60598-2-3:2002/AMD1:2011 IEC 60598-1:2020	UL E493462 Tested with appliance
LED lens	C	TEIJIN POLYCARBONATE CHINA LTD	L-1250U(#)(f1), L-1250V(#)(f1), L-1250Z(#)(f1)	HB; 115°C	IEC 60598-2-3:2002 IEC 60598-2-3:2002/AMD1:2011 IEC 60598-1:2020	UL E245526 Tested with appliance
Reflector	C	MITSUBISHI ENGINEERING-PLASTICS CORP	S-3000+(f1)	HB; 115°C	IEC 60598-2-3:2002 IEC 60598-2-3:2002/AMD1:2011 IEC 60598-1:2020	UL E41179 Tested with appliance
Glass cover	C	MIC Optoelectronic Co.,Ltd	GLA	-40°C to 200°C; Δt:200°C	IEC 60598-2-3:2002 IEC 60598-2-3:2002/AMD1:2011 IEC 60598-1:2020	Tested with appliance
LED PCB	C	Huizhou Sanlicheng Technology Co Ltd	YSL-L1	V-0; 130°C	EN 60598-2-3 EN IEC 60598-1	UL E479275 Tested with appliance
LED	C	LUXEON	L150-6570502400000	5050; If:1240mA; Vf: 24V; CCT 2700-6000K	IEC TR 62778:2014	Tested with appliance
NEMA socket and its Shorting cap	B	Zhejiang Qicheng Electrical Equipment Co., Ltd.	LC-10K(male) LC-10R/5(female)	480VAC, 50/60Hz, Max.15A, -40°C~100°C	IEC 61984:2008	SGS CB: FI-43492
Surge protective device	B	Guangdong ZP Lightning Protection Technology Co., Ltd.	ZP-LED-P10D	Un:100~277VAC Uc:320VAC; 50/60Hz; In:10kV; Uoc:10kV; Isccr: 300A; Up: 1,3kV (L-N and L/N-GND); ta:-40~85°C; IP67	IEC 61643-11:2011 EN 61643-11:2012+A11:2018	TÜV Rh Mark R 50516300001

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Clause	Requirement + Test	Result - Remark	Verdict

LED driver	B	Shen Zhen MOSO Electronics Technology Co., Ltd.	X6-320M062	Input: 100-277VAC; 50/60Hz; Max. 4,2A; Output: 38-62VDC; Max. 80VDC; 0,75-7,5A; 320W; ta. 50ºC(Input 100-200V~); ta. 60ºC(Input 200-277V~) tc. 90ºC Constant current; Class I; IP67; SELV; Independent	EN 61347-1:2014+A1:2017 EN 61347-2-13:2015+AQ:2021	TUV Rh ENEC HN 69290094 0002
LED driver	B	SHENZHEN MOSO ELECTRONICS TECHNOLOGY CO., LTD	X6E-150M056-G	Input: 100-277VAC; 50/60Hz; 2,0A; Output: 28-56VDC; Max. 70VDC;0,43-4,30A; 150W; ta 50ºC(Input 120-200V~); ta 55ºC(Input 200-277V~); tc 90ºC Constant current; Class I; IP67; SELV; Independent	EN 61347-1:2014+A1:2017 EN 61347-2-13:2015+AQ:2021 EN IEC 62384:2020	TUV SUD ENEC U6 077716 0300 Rev. 02
LED driver	B	SHENZHEN MOSO ELECTRONICS TECHNOLOGY CO., LTD	X6E-075M056-G	Input: 100-277VAC; 50/60Hz; 0,9A; Output: 28-56VDC; Max. 80VDC;0,215-2,15A; 75W; ta 50ºC(Input 120-200V~); ta 55ºC(Input 200-277V~); tc 90ºC Constant current; Class I; IP67; SELV; Independent	EN 61347-1:2014+A1:2017 EN 61347-2-13:2015+AQ:2021 EN IEC 62384:2020	TUV SUD ENEC U6 077716 0300 Rev. 02

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	**TABLE: Thermal tests of Section 12**		P
1	Type reference ..... :	MSL-F300	—
	Lamp used..... :	LED module	—
	Lamp control gear used ..... :	X6-320M062	—
	Mounting position of luminaire ..... :	Normal use mounting	—
	Supply wattage (W) ..... :	311,0 (106V) 300,0 (293,6V)	—
	Supply current (A) ..... :	2,436 (106V) 1,247 (293,6V)	—
	Temperatures in test 1 - 4 below are corrected for ta (°C) ..... :	45	—
	- abnormal operating mode ..... :	--	—
3.12 (12.4)	- test 1: rated voltage ..... :	100V; 2,634A; 313,2W 277V; 1,127A; 301,1W	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current ..... :	1,06x100V=106V 1,06x277V=293,6V	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	--	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	--	—
3.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current or 130/150% of rated input voltage ..... :	--	—

Temperature measurements (°C)

Part	Ambient	**Cl. 12.4 – normal**						**Cl. 12.5 – abnormal**	
		test 1 100V	test 1 277V	test 2 106V	test 2 293,6V	test 3	limit	test 4	limit
Supply cord	45	--	--	48,3	47,5	--	90	--	--
Coupler terminal	45	--	--	51,5	51,0	--	80	--	--
Class-end connector	45	--	--	66,8	62,3	--	Ref.	--	--
Input cord of LED driver	45	--	--	78,3	76,0	--	90	--	--
tc of LED driver	45	86,2	80,1	--	--	--	90	--	--
Output wire of LED driver	45	--	--	80,8	78,8	--	90	--	--
Input wire near LED	45	--	--	85,9	84,2	--	90	--	--
LED PCB, represents reflector	45	--	--	96,8	95,2	--	Ref.	--	--
LED lens, near LED	45	--	--	95,7	94,9	--	Ref.	--	--

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Clause	Requirement + Test	Result - Remark	Verdict

NEMA socket and its Shorting cap	45	--	--	70,5	65,1	--	Ref.	--	--
Lead wires to NEMA socket	45		--	63,9	62,7	--	Ref.	--	--
Mounting surface	45	--	--	48,6	47,8	--	90	--	--
Lighting surface (10cm)	45		--	69,9	69,8	--	90	--	--
Supplementary information: --									

ANNEX 2	**TABLE: Thermal tests of Section 12**		P
2	Type reference ..... :	MSL-F150	—
	Lamp used..... :	LED module	—
	Lamp control gear used ..... :	X6E-150M056-G	—
	Mounting position of luminaire ..... :	Normal use mounting	—
	Supply wattage (W) ..... :	155,9 (100V); 149,8 (277V)	—
	Supply current (A) ..... :	1,302 (100V) 0,538 (277V)	—
	Temperatures in test 1 - 4 below are corrected for ta (°C) ..... :	45	—
	- abnormal operating mode ..... :	--	—
3.12 (12.4)	- test 1: rated voltage ..... :	100V / 277V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current ..... :	--	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	--	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	--	—
3.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current or 130/150% of rated input voltage ..... :	--	—

Temperature measurements (°C)

Part	Ambient	Cl. 12.4 – normal						Cl. 12.5 – abnormal	
		test 1 100V	test 1 277V	test 2 106V	test 2 293,6V	test 3	limit	test 4	limit
tc of LED driver	45	81,4	72,3	--	--	--	90	--	--
Supplementary information: --									

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	**TABLE: Thermal tests of Section 12**		P
3	Type reference ..... :	MSL-F60	—
	Lamp used..... :	LED module	—
	Lamp control gear used ..... :	X6E-075M056-G	—
	Mounting position of luminaire ..... :	Normal use mounting	—
	Supply wattage (W) ..... :	64,8 (100V) 62,0 (277V)	—
	Supply current (A) ..... :	0,539 (100V) 0,241 (277V)	—
	Temperatures in test 1 - 4 below are corrected for ta (°C) ..... :	45	—
	- abnormal operating mode ..... :	--	—
3.12 (12.4)	- test 1: rated voltage ..... :	100V / 277V	—
	- test 2: 1,06 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current ..... :	--	—
	- test 3: Load on wiring to socket-outlet, 1,06 times voltage or 1,05 times wattage ..... :	--	—
	Through wiring or looping-in wiring loaded by a current of A during the test ..... :	--	—
3.12 (12.5)	- test 4: 1,1 times rated voltage or 1,05 times rated wattage or 1,1 times constant voltage/current or 130/150% of rated input voltage ..... :	--	—

Temperature measurements (°C)

Part	Ambient	Cl. 12.4 – normal						Cl. 12.5 – abnormal	
		test 1 100V	test 1 277V	test 2 106V	test 2 293,6V	test 3	limit	test 4	limit
tc of LED driver	45	69,9	63,2	--	--	--	90	--	--
Supplementary information: --									

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Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 3	**Screw terminals (part of the luminaire)**		N/A
(14)	**SCREW TERMINALS**		N/A
(14.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm²).....:		—
(14.3.3)	Conductor space (mm).....:		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread) .....:	M	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm) .....:		N/A
	Torque (Nm).....:		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N).....:		N/A
(14.4.8)	Without undue damage		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 4	**Screwless terminals (part of the luminaire)**		N/A
(15)	**SCREWLESS TERMINALS**		N/A
(15.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5)	Terminals and connections for internal wiring		N/A
(15.5.1)	Mechanical tests		N/A
(15.5.1.1.1)	Pull test spring-type terminals (4 N, 4 samples) .....:		N/A
(15.5.1.1.2)	Pull test pin or tab terminals (4 N, 4 samples) .....:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples).....:		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....:		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....:		N/A
(15.6)	Terminals and connections for external wiring		N/A
(15.6.1)	Conductors		N/A
	Terminal size and rating		N/A

IEC 60598-2-3			
Clause	Requirement + Test	Result - Remark	Verdict

15.6.2	Mechanical tests		N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) .....:		N/A
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N) .....:		N/A
(15.6.3)	Electrical tests		N/A
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N/A

(15.6.3.1) (15.6.3.2)	**TABLE: Contact resistance test / Heating tests**									P
	Voltage drop (mV) after 1 h									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Voltage drop of two inseparable joints				--					N/A
	Voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV) ..... :									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Voltage drop after 50th alt. 100th cycle									P
	Max. allowed voltage drop (mV) ..... :				--					—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Continued ageing: voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV) ..... :				--					—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Continued ageing: voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV) ..... :				--					—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)										
Supplementary information:										

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT

IEC 60598-2-3

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES

Luminaires

Part 2: Particular requirements

Section 3: Luminaires for road and street lighting

Differences according to ..... :	EN 60598-2-3:2003 + A1:2011 used in conjunction with EN IEC 60598-1:2021 + A11:2022
TRF template used ..... :	IECEE OD-2020-F2:2020, Ed. 1.1
Attachment Form No..... :	EU_GD_IEC60598_2_3M
Attachment Originator ..... :	UL(Demko)
Master Attachment..... :	2022-05-24

	CENELEC COMMON MODIFICATIONS (EN)		P
3.5 (3)	**MARKING**		P
3.5 (3.2.12)	Note 4 deleted		N/A
3.6 (4)	**CONSTRUCTION**		P
4.7 (4.11.6)	Electro-mechanical contact systems: electric strength test at 1 500 V		N/A
3.10 (5)	**EXTERNAL AND INTERNAL WIRING**		P
3.10 (5.2.2)	Cables equal to EN 50525 (all parts)		N/A
	Paragraph 2 deleted		N/A
	Replace table 5.1 – Supply cord		P
3.12 (12)	**ENDURANCE TESTS AND THERMAL TESTS**		P
3.12 (12.4.2c)	Thermal test (normal operation) see footnote c to table 12.2 relating to unsleeved fixed wiring		N/A
ZB	**ANNEX ZB, SPECIAL NATIONAL CONDITIONS (EN)**		N/A
(3.3)	DK: power supply cords of class I luminaires with label		N/A
(5.2.1)	CY, DK, FI, UK: type of plug		N/A

EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES			
Clause	Requirement + Test	Result - Remark	Verdict
(5.2.18)	DK: socket-outlets		N/A
ZC	**ANNEX ZC, NATIONAL DEVIATIONS (EN)**		N/A
(4 & 5)	FR: Shuttered socket-outlets 10/16A		N/A
	FR: Safety requirements for high buildings *(Decree of 30 December 2011 on safety regulations for the construction of high-rise buildings and their protection against fire and panic risks; Section VIII; Article GH 48, Lighting)* Glow-wire test for outer parts of luminaires:		N/A
	- 850°C for luminaires in stairways and horizontal travel paths		N/A
	- 650°C for indoor luminaires		N/A
	UK: Requirements according to United Kingdom Building Regulation		N/A

Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 62031
LED modules for general lighting – Safety specifications

Report Number. ..... :	Attachment 2 of CN24XBA1 001
Date of issue ..... :	See main report of IEC 60598-2-3
Total number of pages ..... :	24 pages
Name of Testing Laboratory preparing the Report ..... :	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
Applicant's name ..... :	See main report of IEC 60598-2-3
Address ..... :	See main report of IEC 60598-2-3
Test specification:	
Standard ..... :	IEC 62031:2018
Test procedure ..... :	CB Scheme
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC62031F
Test Report Form(s) Originator .... :	Intertek Semko AB
Master TRF ..... :	2018-06-14

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description ..... :		Built-in module	
Trade Mark ..... :		See main report of IEC 60598-2-3	
Manufacturer ..... :		See main report of IEC 60598-2-3	
Model/Type reference ..... :		General product information	
Ratings ..... :		General product information	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.	
Testing location/ address ..... :		101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China	
Tested by (name, function, signature) ..... :		See main report of IEC 60598-2-3	
Approved by (name, function, signature) ... :		See main report of IEC 60598-2-3	
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		N/A	
Approved by (name, function, signature) ... :		N/A	
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name + signature) ..... :		N/A	
Witnessed by (name, function, signature) . :		N/A	
Approved by (name, function, signature) ... :		N/A	
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		N/A	
Witnessed by (name, function, signature) . :		N/A	
Approved by (name, function, signature) ... :		N/A	
Supervised by (name, function, signature) :		N/A	

List of Attachments (including a total number of pages in each attachment):

N/A

Summary of testing:

Tests performed (name of test and test clause):

Clauses	Test
IEC 62031:2018	
6	MARKING
10 (11)	Moisture resistance and insulation
11 (12)	Electric strength
12 (14)	Fault conditions
15 (16)	CREEPAGE DISTANCES AND CLEARANCES
22	Photobiological safety

Testing location:

Shenzhen Southern LCS Compliance Testing Laboratory Ltd.

101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China

Summary of compliance with National Differences:

List of countries addressed

N/A

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

For built-in module:

1PB02965E01A
MIC Optoelectronic Co.,Ltd

Test item particulars.....:	Built-in module
Classification of installation and use.....:	See main report of IEC 60598-2-3
Supply Connection.....:	Input wire
.....:	
Possible test case verdicts:	
- test case does not apply to the test object.....:	N/A
- test object does meet the requirement.....:	P (Pass)
- test object does not meet the requirement.....:	F (Fail)
Testing.....:	
Date of receipt of test item .....:	See main report of IEC 60598-2-3
Date (s) of performance of tests.....:	See main report of IEC 60598-2-3

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

Clause numbers between brackets refer to clauses in IEC 61347-1

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided ..... :	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies).....: See main report of IEC 60598-2-3

General product information:

Built-in module

LED module model list:

Model No.	Input current	Power	LED quantity	LED module Model No.
MSL-F300	2,5A	300W	192pcs	1PB02965E01A
MSL-F240	2,0A	240W	160pcs	1PB02805E02A
MSL-F200	1,67A	200W		
MSL-F180	1,50A	180W	96pcs	1PB02485E10A
MSL-F150	1,25A	150W		
MSL-F120	1,00A	120W	72pcs	1PB02365E08A
MSL-F100	0,83A	100W		
MSL-F80	0,67A	80W	48pcs	1PB02245E07A
MSL-F60	0,50A	60W	32pcs	1PB02165E08A
MSL-F50	0,42A	50W		
MSL-F25	0,21A	25W		

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
4	**GENERAL REQUIREMENTS**		P
4.2	Classification		P
	Built-in module ..... :	Yes ☒ No ☐	—
	Independent module..... :	Yes ☐ No ☒	—
	Integral module ..... :	Yes ☐ No ☒	—
4.6	Independent modules comply with requirements in IEC 60598-1:2014/AMD1:2017		N/A
4.8	Modules with integrated controlgear providing SELV comply with requirements according to IEC 61347-1:2015/AMD1:2017 clause L.5 to L.11.	(see Annex 1)	N/A
6	**MARKING**		P
6.2	**Contents of marking for built-in and for independent LED modules**		**P**
	a) mark of origin		P
	b) model number, type reference		P
	c1) constant voltage module; rated supply voltage and supply frequency		N/A
	c2) constant current module; rated supply current and supply frequency		N/A
	d) rated power		N/A
	e) indication of connections, wiring diagram		N/A
	f) value of t_c and place on the module		N/A
	g) E_{thr} if required		N/A
	h) symbol for built-in modules		N/A
	i) heat transfer temperature t_d		N/A
	j) power for heat-conduction P_d		N/A
	k) working voltage for insulation		N/A
6.3	**Location of marking for built-in LED modules**		**P**
	- marking of a) and b) in 6.2 on the modules		P
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		P
6.4	**Location of marking for independent LED modules**		**N/A**
	- marking of a), b), c) and f) in 6.2 on the modules		N/A
	- marking of other applicable items in 6.2 on the modules or in data sheet, leaflet or website		N/A
6.5	**Marking of integral LED modules**		**N/A**

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	- information in 6.2 a) to g) in data sheet, leaflet or website		N/A
6.6	**Durable and legibility of marking**		**P**
	- marking on the LED module legible after test with water		P
	- marking not on the LED module legible		P
7	**TERMINALS**		N/A
7.1	**Integral terminals**		N/A
	Screw terminals comply with section 14 of IEC 60598-1	(see Annex 3)	N/A
	Screwless terminals comply with section 15 of IEC 60598-1	(see Annex 4)	N/A
7.2	**Terminals other than integral terminals**		N/A
	Separately approved; component list	(see Annex 2)	N/A
	Ratings suit the conditions		N/A
	Satisfy additional relevant requirements of this standard		N/A
8 (9)	**EARTHING**		**N/A**
- (9.1)	**Provisions for protective earthing**		**N/A**
	Terminal complying with clause 8		N/A
	Locked against loosening and not possible to loosen by hand		N/A
	Not possible to loosen clamping means unintentionally on screwless terminals		N/A
	Earthing via means of fixing		N/A
	Earthing terminal only used for the earthing of the control gear		N/A
	All parts of material minimizing the danger of electrolytic corrosion		N/A
	Made of brass or equivalent material		N/A
	Contact surface bare metal		N/A
	Test according 7.2.3 of IEC 60598-1		N/A
- (9.2)	**Provision for functional earthing**		**N/A**
	Comply with clause 8 and 9.1		N/A
	Functional earth insulated from live parts by double or reinforced insulation		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
- (9.3)	**Lamp controlgear with conductors for protective earthing by tracks on printed circuit board**		**N/A**
	Test with a current of 25 A between earthing terminal and each of the accessible metal parts; measured resistance (Ω) at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω .....:		N/A
- (9.4)	**Earthing of built-in lamp controlgear**		**N/A**
	Earth by means of fixing to earthed metal of luminaire in compliance of 7.2 of IEC 60598-1		N/A
	Earthing terminal only for earthing the built-in controlgear		N/A
- (9.5)	**Earthing via independent controlgear**		**N/A**
- (9.5.1)	Earth connection to other equipment		N/A
	Looping or through connection, conductor min. 1,5 mm² and of copper or equivalent		N/A
	Protective earthing wires in line with 5.3.1.1 and clause 7		N/A
- (9.5.2)	Earthing of the lamp compartments powered via the independent lamp controlgear		N/A
	Test with a current of 25 A between input and output earth terminals; measured resistance (Ω) between earthing terminal and each of the accessible metal parts at ≥ 10 A according 7.2.3 of IEC 60598-1: < 0,5 Ω .....:		N/A
	Output earthing terminal marked as in 7.1 t) of IEC 61347-1		N/A
9 (10)	**PROTECTION AGAINST ACCIDENTAL CONTACT WITH LIVE PARTS**		**N/A**
- (10.1)	Controlgear protected against accidental contact with live parts		N/A
- (A2)	Voltage measured with 50 kΩ	(see Annex A)	N/A
- (A3)	Voltage > 35 V peak or > 60 V d.c. or protective impendance device	(see Annex A)	N/A
- (10.1)	Lacquer or enamel not used for protection or insulation		N/A
	Adequate mechanical strength on parts providing protection		N/A
- (10.2)	Capacitors > 0,5 μF: voltage after 1 min (V): < 50 V .....:		N/A
- (10.3)	Controlgear providing SELV		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Accessible conductive parts are insulated from live parts by double or reinforced insulation in SELV controlgear		N/A
	No connection between output circuit and the body or protective earthing circuit		N/A
	No possibility of connection between output circuit and the body or protective earthing circuit through other conductive parts		N/A
	SELV outputs separated from earth by at least basic insulation		N/A
	ELV conductive parts insulated as live parts		N/A
	Tests according Annex L of IEC 61347-1		N/A
- (10.4)	Accessible conductive parts in SELV circuits		N/A
	Output voltage under load ≤ 25 V r.m.s. or ≤ 60 V d.c.		N/A
	If output voltage > 25 V r.m.s. or > 60 V d.c.; No load output ≤ 35 V peak or ≤ 60 V d.c and touch current does not exceed 0,7 mA (peak) or 2 mA d.c. ..... :		N/A
	One conductive part is insulated if output voltage or current exceeding the values above and withstand test voltage 500 V		N/A
	Double or reinforced insulation bridged by appropriate and at least two resistors or two Y2 capacitors or one Y1 capacitor		N/A
	Y1 or Y2 capacitors comply with IEC 60384-14		N/A
	Resistors comply with test (a) in 14.1 of IEC 60065		N/A
10 (11)	**MOISTURE RESISTANCE AND INSULATION**		**P**
	After storage 48 h at 91-95% relative humidity and 20-30 °C measuring of insulation resistance with d.c. 500 V (MΩ):		P
	For basic insulation ≥ 2 MΩ ..... :	Min.100 MΩ>1 MΩ	P
	For double or reinforced insulation ≥ 4 MΩ ..... :		N/A
	Between primary and secondary circuits in controlgear providing SELV, values in Annex L in IEC 61347-1		N/A
11 (12)	**ELECTRIC STRENGTH**		**P**
	Immediately after clause 11 electric strength test for 1 min		P
	Basic insulation for SELV, test voltage 500 V		P

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Working voltage ≤ 50 V, test voltage 500 V		N/A
	Working voltage > 50 V ≤ 1000 V, test voltage (V):		N/A
	Basic insulation, 2U + 1000 V		N/A
	Supplementary insulation, 2U + 1000 V		N/A
	Double or reinforced insulation, 4U + 2000 V		N/A
	No flashover or breakdown		P
	Solid or thin sheet insulation for double or reinforced insulation fulfil the requirements in Annex N in IEC 61347-1		N/A
12 (14)	**FAULT CONDITIONS**		**P**
- (14.1)	When operated under fault conditions the controlgear:		P
	- does not emit flames or molten material		P
	- does not produce flammable gases		P
	- protection against accidental contact not impaired		P
	Thermally protected controlgear does not exceed the marked temperature value		N/A
	Fault conditions: capacitors, resistors or inductors without proof of compliance with relevant specifications have been short-circuited or disconnected	(see appended table)	N/A
- (14.2)	Short-circuit of creepage distances and clearances if less than specified in clause 16 in Part 1 (after any reduction in 14.2 - 14.5)	(see appended table)	N/A
- (14.3)	Short-circuit or interruption of semiconductor devices	(see appended table)	P
- (14.4)	Short-circuit across insulation consisting of lacquer, enamel or textile	(see appended table)	N/A
- (14.5)	Short-circuit across electrolytic capacitors	(see appended table)	N/A
	Short-circuit or interruption of SPDs	(see appended table)	N/A
- (14.6)	After the tests has been carried out on three samples:		P
	The insulation resistance ≥ 1 MΩ .....:	Min.100 MΩ>1 MΩ	P
	No flammable gases		P
	No accessible parts have become live		P
	During the tests, a five-layer tissue paper, where the test specimen is wrapped, does not ignite		P
- (14.7)	Relevant fault condition tests with high-power a.c. supply and in turn to a d.c. supply		—
12.2	**Overpower condition**		**P**

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	Module withstands overpower condition >15 min.		P
	Module with automatic protective device or power limiter, test performed 15 min. at limit.		N/A
	No fire, smoke or flammable gas is produced		P
	Molten material does not ignite tissue paper, spread below the module		P
14 (15)	**CONSTRUCTION**		**P**
- (15.1)	**Wood, cotton, silk, paper and similar fibrous material**		**P**
	Wood, cotton, silk, paper and similar fibrous material not used as insulation		P
- (15.2)	**Printed circuits**		**P**
	Printed circuits used as internal connections complies with clause 14		P
15 (16)	**CREEPAGE DISTANCES AND CLEARANCES**		**P**
- (16.1)	**General**		P
	Creepage distances and clearances according to 16.2 and 16.3		P
	Controlgears providing SELV comply with additional requirements in Annex L		N/A
	Insulating lining of metallic enclosures		N/A
	Controlgear protected against pollution comply with Annex P		N/A
- (16.2)	**Creepage distances**		P
- (16.2.2)	Minimum creepage distances for working voltages		P
	Creepage distances according to Table 7	(see appended table)	P
- (16.2.3)	Creepage distances for working voltages with frequencies above 30 kHz		N/A
	Creepage distances according to Table 8	(see appended table)	N/A
- (16.3)	**Clearances**		P
- (16.3.2)	Clearances for working voltages		P
	Clearances distances according to Table 9	(see appended table)	P
- (16.3.3)	Clearances for ignition voltages and working voltages with higher frequencies		N/A
	Clearances distances for basic or supplementary insulation according to Table 10		N/A
	Clearances distances for reinforced insulation according to Table 11		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
16 (17)	**SCREWS, CURRENT-CARRYING PARTS AND CONNECTIONS**		**P**
	Screws, current-carrying parts and connections in compliance with IEC 60598-1 (clause numbers between parentheses refer to IEC 60598-1)		—
(4.11)	**Electrical connections**		**P**
(4.11.1)	Contact pressure		N/A
(4.11.2)	Screws:		N/A
	- self-tapping screws		N/A
	- thread-cutting screws		N/A
(4.11.3)	Screw locking:		N/A
	- spring washer		N/A
	- rivets		N/A
(4.11.4)	Material of current-carrying parts		P
(4.11.5)	No contact to wood or mounting surface		P
(4.11.6)	Electro-mechanical contact systems		N/A
(4.12)	**Mechanical connections and glands**		**N/A**
(4.12.1)	Screws not made of soft metal		N/A
	Screws of insulating material		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
	Torque test: torque (Nm); part.....:		N/A
(4.12.2)	Screws with diameter < 3 mm screwed into metal		N/A
(4.12.4)	Locked connections:		N/A
	- fixed arms; torque (Nm) .....:		N/A
	- lampholder; torque (Nm) .....:		N/A
	- push-button switches; torque 0,8 Nm .....:		N/A
(4.12.5)	Screwed glands; force (Nm).....:		N/A

17 (18)	**RESISTANCE TO HEAT, FIRE AND TRACKING**		**N/A**
- (18.1)	Ball-pressure test .....:	See Test Table 17 (18.1)	N/A
- (18.2)	Test of printed boards .....:	See Test Table 17 (18.2)	N/A
- (18.3)	Glow-wire test (650°C) .....:	See Test Table 17 (18.3)	N/A
- (18.4)	Needle-flame test (10 s) .....:	See Test Table 17 (18.4)	N/A
- (18.5)	Proof tracking test .....:	See Test Table 17 (18.5)	N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
18	**RESISTANCE TO CORROSION**		**N/A**
	Comply with requirements according 4.18 of IEC 60598-1		N/A
20	**HEAT MANAGEMENT**		**N/A**
20.1	**General**		**N/A**
	Fulfil clause 20 if replaceable LED module and when heat conducting thermal interface is needed.		N/A
20.2	**Thermal interface material**		**N/A**
	Thermal interface material delivered with the module if necessary		N/A
20.3	**Heat protection**		**N/A**
	Not impair safety when operated under poor heat-conduction conditions according Annex D		N/A
22	**PHOTOBIOLOGICAL SAFETY**		**P**
22.1	**UV radiation**		**N/A**
	Luminous radiation not exceed 2mW/klm		N/A
22.2	**Blue light hazard**		**P**
	Assessed according to IEC TR 62778	RG1 unlimited	P
22.3	**Infrared radiation**		**N/A**
	Requirements for infrared radiation when required		N/A
A	**ANNEX A - TESTS**		**N/A**
	All tests performed in accordance with the advice given in Annex H of IEC 61347-1, if applicable		N/A
12 (14)	**TABLE: tests of fault conditions**		**P**
Part	**Simulated fault**		**Hazard**
LED	SC, unit normal operation, no flames, no gases, recoverable		No

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

15 (16)	**TABLE: clearance and creepage distance measurements (mm)(See main report of IEC 60598-2-3)**						**P**
Applicable part of IEC 61347-1 Table 7 – 11*							
Distances	**Insulation type ****	**Measured clearance**	**Required**		**Measured creepage**	**Required**	
			clearance	***Table**		**creepage**	***Table**
Distance 1:	--	--	--	--	--	--	--
Working voltage (V) ..... :					--		—
Frequency if applicable (kHz) ..... :					--		—
PTI..... :					< 600 ☐ ≥ 600 ☐		—
Peak value of the working voltage $\hat{U}_{out}$ if applicable (kV) ..... :					--		—
Pulse voltage if applicable (kV) ..... :					--		—
Supplementary information: See main report of IEC 60598-2-3							

** Insulation type: B – Basic; S – Supplementary; R – Reinforced

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

17 (18.1)	TABLE: Ball Pressure Test of Thermoplastics			N/A
Allowed impression diameter (mm) ..... :		2		—
Object/ Part No./ Material	Manufacturer/ trademark	Test temperature (°C)	Impression diameter (mm)	
--	--	--	--	
Supplementary information:				

17 (18.2)	TABLE: Test of printed boards				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (s)	Ignition of specified layer Yes/No	Duration of burning (s)	Verdict
--	--	--	--	--	--
Supplementary information:					

17 (18.3)	TABLE: Glow-wire test					N/A
Glow wire temperature ..... :		650°C				—
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict	
--	--	--	--	--	--	
Any flame or glowing of the sample extinguished within 30 s of withdrawing the glow-wire, and any burning or molten drop did not ignite the underlying parts (Yes/No) ..... :					--	
Supplementary information:						

17 (18.4)	TABLE: Needle-flame test				N/A
Object/ Part No./ Material	Manufacturer/ trademark	Duration of application of test flame (ta); (s)	Ignition of specified layer Yes/No	Duration of burning (tb) (s)	Verdict
--	--	--	--	--	--
Supplementary information:					

17 (18.5)	TABLE: Proof tracking test		N/A
Test voltage PTI ..... :		175 V	—

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

Object/ Part No./ Material	Manufacturer/ trademark	Withstand 50 drops without failure on three places or on three specimens			Verdict
--	--	--	--	--	--
Supplementary information:					

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

(A)	**ANNEX A - TEST TO ESTABLISH WHETHER A CONDUCTIVE PART IS A LIVE PART WHICH MAY CAUSE AN ELECTRIC SHOCK**		**N/A**
(A.1)	Comply with A.2 or A.3		N/A

ANNEX 1	**LED MODULES WITH INTEGRAL CONTROLGEAR PROVIDING SELV**		**N/A**
(L.5)	**Protection against electric shock**		N/A
	Comply with 9.2 of IEC 61558-1		N/A
(L.6)	**Heating**		N/A
	No excessive temperatures in normal use		N/A
	Value if capacitor tc marked .....:		—
	Winding insulation classified as Class .....:		—
	Comply with tests of clause 14 of IEC 61558-1 with adjustments		N/A
(L.7)	**Short-circuit and overload protection**		N/A
	Comply with tests of clause 15 of IEC 61558-1 with adjustments		N/A
(L.8)	**Insulation resistance and electric strength**		N/A
(L.8.1)	Conditioned 48 h between 91 % and 95 %		N/A
(L.8.2)	Insulation resistance		N/A
	Between input- and output circuits not less than 5 MΩ .....:		N/A
	Between metal parts of class II convertors which are separated from live parts by basic insulation only and the body not less than 5 MΩ .....:		N/A
	Between metal foil in contact with the inner and outer surfaces of enclosures of insulating material not less than 2 MΩ .....:		N/A
(L.8.3)	Electric strength		N/A
	1) Between live parts of input circuits and live parts of output circuits .....:		N/A
	2) Over basic or supplementary insulation between:		N/A
	a) live parts having different polarity .....:		N/A
	b) live parts and body if intended to be connected to protective earth .....:		N/A
	c) accessible metal parts and a metal rod of the same diameter as the flexible cable or cord .....:		N/A
	d) live parts and an intermediate metal part .....:		N/A
	e) intermediate metal parts and the body .....:		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict
	f) each input circuit and all other input circuits .....:		N/A
	3) Over reinforced insulation between the body and live parts .....:		N/A
(L.9)	**Construction**		N/A
(L.9.1)	Transformer comply with 19.12 of IEC 61558-1 and 19 of IEC 61558-2-6		N/A
	HF transformer comply with 19 of IEC 61558-2-16		N/A
(L.10)	**Components**		N/A
	Protective devices comply with 20.6 – 20.11 of IEC 61558-1		N/A
(L.11)	**Creepage distances, clearances and distances through insulation**		N/A
	Creepage distances and clearances not less than in Clause 16		N/A
	Distance through insulation according Table L.5 in IEC 61347-1		N/A
	1) Basic distance through insulation		N/A
	Required distance (mm) .....:		—
	Measured (mm) .....:		N/A
	Supplementary information		—
	2) Supplementary distance through insulation		N/A
	Required distance (mm) .....:		—
	Measured (mm) .....:		N/A
	Supplementary information		—
	3) Reinforced distance through insulation		N/A
	Required distance (mm) .....:		—
	Measured (mm) .....:		N/A
	Supplementary information		—

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 2	TABLE: Critical components information					
Object / part No.	**Code**	**Manufacturer/ trademark**	**Type / model**	**Technical data**	**Standard**	**Mark(s) of conformity[1)]**
See main report of IEC 60598-2-3						

Supplementary information:

[1)] Provided evidence ensures the agreed level of compliance. See OD-CB2039.

The codes above have the following meaning:

A - The component is replaceable with another one, also certified, with equivalent characteristics

B - The component is replaceable if authorised by the test house

C - Integrated component tested together with the appliance

D - Alternative component

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 3	**Screw terminals (part of the luminaire)**		N/A
(14)	**SCREW TERMINALS**		N/A
(14.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(14.3.2.1)	One or more conductors		N/A
(14.3.2.2)	Special preparation		N/A
(14.3.2.3)	Terminal size		N/A
	Cross-sectional area (mm²).....:		—
(14.3.3)	Conductor space (mm).....:		N/A
(14.4)	Mechanical tests		N/A
(14.4.1)	Minimum distance		N/A
(14.4.2)	Cannot slip out		N/A
(14.4.3)	Special preparation		N/A
(14.4.4)	Nominal diameter of thread (metric ISO thread).....:	M	N/A
	External wiring		N/A
	No soft metal		N/A
(14.4.5)	Corrosion		N/A
(14.4.6)	Nominal diameter of thread (mm).....:		N/A
	Torque (Nm).....:		N/A
(14.4.7)	Between metal surfaces		N/A
	Lug terminal		N/A
	Mantle terminal		N/A
	Pull test; pull (N).....:		N/A
(14.4.8)	Without undue damage		N/A

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ANNEX 4	**Screwless terminals (part of the luminaire)**		N/A
(15)	**SCREWLESS TERMINALS**		N/A
(15.2)	Type of terminal.....:		—
	Rated current (A).....:		—
(15.3.1)	Material		N/A
(15.3.2)	Clamping		N/A
(15.3.3)	Stop		N/A
(15.3.4)	Unprepared conductors		N/A
(15.3.5)	Pressure on insulating material		N/A
(15.3.6)	Clear connection method		N/A
(15.3.7)	Clamping independently		N/A
(15.3.8)	Fixed in position		N/A
(15.3.10)	Conductor size		N/A
	Type of conductor		N/A
(15.5.1)	Terminals internal wiring		N/A
(15.5.1.1)	Pull test spring-type terminals (4 N, 4 samples) .....:		N/A
(15.5.1.2)	Pull test pin or tab terminals (4 N, 4 samples) .....:		N/A
	Insertion force not exceeding 50 N		N/A
(15.5.1.2)	Permanent connections: pull-off test (20 N)		N/A
(15.5.2)	Electrical tests		N/A
	Voltage drop (mV) after 1 h (4 samples).....:		N/A
	Voltage drop of two inseparable joints		N/A
	Number of cycles:		—
	Voltage drop (mV) after 10th alt. 25th cycle (4 samples).....:		N/A
	Voltage drop (mV) after 50th alt. 100th cycle (4 samples).....:		N/A
	After ageing, voltage drop (mV) after 10th alt. 25th cycle (4 samples) .....:		N/A
	After ageing, voltage drop (mV) after 50th alt. 100th cycle (4 samples) .....:		N/A
(15.6)	Terminals and connections for external wiring		N/A
(15.6.1)	Conductors		N/A
	Terminal size and rating		N/A

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Clause	Requirement + Test	Result - Remark	Verdict

(15.6.2)	Mechanical tests		N/A
(15.6.2.1)	Pull test spring-type terminals or welded connections (4 samples); pull (N) .....:		N/A
(15.6.2.2)	Pull test pin or tab terminals (4 samples); pull (N) .....:		N/A
(15.6.3)	Electrical tests		N/A
	Tests according 15.6.3.1 + 15.6.3.2 in IEC 60598-1		N/A

(15.6.3.1) (15.6.3.2)	**TABLE: Contact resistance test / Heating tests**									N/A
	Voltage drop (mV) after 1 h									—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Voltage drop of two inseparable joints									N/A
	Voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV) ..... :	--								—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV) ..... :	--								—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Continued ageing: voltage drop after 10th alt. 25th cycle									N/A
	Max. allowed voltage drop (mV) ..... :	--								—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
	Continued ageing: voltage drop after 50th alt. 100th cycle									N/A
	Max. allowed voltage drop (mV) ..... :	--								—
terminal	1	2	3	4	5	6	7	8	9	10
voltage drop (mV)	--	--	--	--	--	--	--	--	--	--
Supplementary information:										

IEC 62031			
Clause	Requirement + Test	Result - Remark	Verdict

ATTACHMENT TO TEST REPORT IEC 62031:2018 EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES (LED MODULES FOR GENERAL LIGHTING - SAFETY SPECIFICATIONS)		
Differences according to.....:	EN IEC 62031: 2020 + A11: 2021	
TRF template used .....:	IECEE OD-2020-F2:2022, Ed. 1.2	
Attachment Form No.....:	EU_GD_IEC62031F	
Attachment Originator .....:	UL Solutions (Demko)	
Master Attachment.....:	Dated 2022-09-30	
	CENELEC COMMON MODIFICATIONS (EN)	
	No Common modifications	**P**
ZA	**ANNEX ZA, NORMATIVE REFERENCES TO INTERNATIONAL PUBLICATIONS WITH THEIR CORRESPONDING EUROPEAN PUBLICATIONS**	**P**
ZZ	**ANNEX ZZ, RELATIONSHIP BETWEEN THIS EUROPEAN STANDARD AND THE SAFETY OBJECTIVES OF DIRECTIVE 2014/35/EU [2014 OJ L96] AIMED TO BE COVERED**	**N/A**

Test Report issued under the responsibility of:

TÜVRheinland®

TEST REPORT
IEC 62471
Photobiological safety of lamps and lamp systems

Report Reference No.....:	Attachment 3 of CN24XBA1 001
Date of issue ..... :	See main report of IEC 60598-2-3
Total number of pages ..... :	17 pages
Name of Testing Laboratory preparing the Report..... :	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.
Applicant's name.....:	See main report of IEC 60598-2-3
Address ..... :	See main report of IEC 60598-2-3
Test specification:	
Standard ..... :	IEC 62471:2006
Test procedure..... :	CB Scheme
Non-standard test method…….:	N/A
Test Report Form No.....:	IEC62471B
TRF Originator ..... :	VDE Testing and Certification Institute
Master TRF ..... :	Dated 2018-08-16

If this Test Report Form is used by non-IECEE members, the IECEE/IEC logo and the reference to the CB Scheme procedure shall be removed.

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

General disclaimer:

The test results presented in this report relate only to the object tested.
This report shall not be reproduced, except in full, without the written approval of the Issuing CB Testing Laboratory. The authenticity of this Test Report and its contents can be verified by contacting the NCB, responsible for this Test Report.

Test item description .....:		Built-in module	
Trade Mark .....:		See main report of IEC 60598-2-3	
Manufacturer.....:		See main report of IEC 60598-2-3	
Model/Type reference .....:		See main report of IEC 60598-2-3	
Ratings .....:		See main report of IEC 60598-2-3	
Responsible Testing Laboratory (as applicable), testing procedure and testing location(s):			
☒	**CB Testing Laboratory:**	Shenzhen Southern LCS Compliance Testing Laboratory Ltd.	
Testing location/ address ..... :		1601-1604, 17-18F, Tower A Building 2, Shenzhen International Innovation Valley, Dashi 1st Road, Xili Street, Xili Community, Nanshan District, Shenzhen 518052, China	
Tested by (name, function, signature) ..... :		See main report of IEC 60598-2-3	
Approved by (name, function, signature) .. :		See main report of IEC 60598-2-3	
☐	**Testing procedure: CTF Stage 1:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		N/A	
Approved by (name, function, signature) .. :		N/A	
☐	**Testing procedure: CTF Stage 2:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name + signature) ..... :		N/A	
Witnessed by (name, function, signature). :		N/A	
Approved by (name, function, signature) .. :		N/A	
☐	**Testing procedure: CTF Stage 3:**	N/A	
☐	**Testing procedure: CTF Stage 4:**	N/A	
Testing location/ address ..... :		N/A	
Tested by (name, function, signature) ..... :		N/A	
Witnessed by (name, function, signature). :		N/A	
Approved by (name, function, signature) .. :		N/A	
Supervised by (name, function, signature) :		N/A	

List of Attachments (including a total number of pages in each attachment):

N/A

Summary of testing:

Tests performed (name of test and test clause):	**Testing location:**
See main report of IEC 60598-2-3	Shenzhen Southern LCS Compliance Testing Laboratory Ltd. 101-201, No.39 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, China

Summary of compliance with National Differences (List of countries addressed):

☒ **The product fulfils the requirements of EN 62471:2008**

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

N/A

Test item particulars .....:	See main report of IEC 60598-2-3
Tested lamp .....:	☒ continuous wave lamps ☐ pulsed lamps
Tested lamp system .....:	
Lamp classification group.....:	☐ exempt ☒ risk 1 ☐ risk 2 ☐ risk 3
Lamp cap .....:	LED
Bulb.....:	N/A
Rated of the lamp .....:	See main report of IEC 60598-2-3
Furthermore marking on the lamp.....:	N/A
Seasoning of lamps according IEC standard .....:	N/A
Used measurement instrument.....:	See equipment list
Temperature by measurement.....:	25,3 °C
Information for safety use.....:	N/A

Possible test case verdicts:

– **test case does not apply to the test object ..... :** N/A

– **test object does meet the requirement ..... :** P (Pass)

– **test object does not meet the requirement ..... :** F (Fail)

Testing:

Date of receipt of test item ..... : See main report of IEC 60598-2-3

Date (s) of performance of tests..... : See main report of IEC 60598-2-3

General remarks:

"(See Enclosure #)" refers to additional information appended to the report.
"(See appended table)" refers to a table appended to the report.

Throughout this report a ☒ comma / ☐ point is used as the decimal separator.

Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:

The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided .....:	☐ **Yes** ☒ **Not applicable**

When differences exist; they shall be identified in the General product information section.

Name and address of factory (ies)..... : See main report of IEC 60598-2-3

General product information and other remarks:

See main report of IEC 60598-2-3

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

4	**EXPOSURE LIMITS**		**P**
4.1	General		P
	The exposure limits in this standard is not less than 0,01 ms and not more than any 8-hour period and should be used as guides in the control of exposure		P
	Detailed spectral data of a light source are generally required only if the luminance of the source exceeds 10^4 cd·m^{-2}	see clause 4.3	P
4.3	Hazard exposure limits		P
4.3.1	Actinic UV hazard exposure limit for the skin and eye		P
	The exposure limit for effective radiant exposure is 30 J·m^{-2} within any 8-hour period		P
	To protect against injury of the eye or skin from ultraviolet radiation exposure produced by a broad-band source, the effective integrated spectral irradiance , E_S, of the light source shall not exceed the levels defined by:		P
	$E_s \cdot t = \sum_{200}^{400} \sum_{t} E_\lambda(\lambda,t) \cdot S_{UV}(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 30$ J·m^{-2}		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye or skin shall be computed by:		P
	$t_{max} = \frac{30}{E_S}$ s		P
4.3.2	Near-UV hazard exposure limit for eye		P
	For the spectral region 315 nm to 400 nm (UV-A) the total radiant exposure to the eye shall not exceed 10000 J·m^{-2} for exposure times less than 1000 s. For exposure times greater than 1000 s (approximately 16 minutes) the UV-A irradiance for the unprotected eye, E_{UVA}, shall not exceed 10 W·m^{-2}.		P
	The permissible time for exposure to ultraviolet radiation incident upon the unprotected eye for time less than 1000 s, shall be computed by:		P
	$t_{max} \le \frac{10\,000}{E_{UVA}}$ s		P
4.3.3	Retinal blue light hazard exposure limit		P
	To protect against retinal photochemical injury from chronic blue-light exposure, the integrated spectral radiance of the light source weighted against the blue-light hazard function, B(λ), i.e., the blue-light weighted radiance , L_B, shall not exceed the levels defined by:		P
	$L_B \cdot t = \sum_{300}^{700} \sum_{t} L_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 10^6$ J · m^{-2} · sr^{-1}	for t ≤ 10^4 s $t_{max} = \frac{10^6}{L_B}$	P

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict
	$L_B = \sum_{300}^{700} L_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 100$ $W \cdot m^{-2} \cdot sr^{-1}$	for t > 10^4 s	N/A
4.3.4	Retinal blue light hazard exposure limit - small source		N/A
	Thus the spectral irradiance at the eye E_λ, weighted against the blue-light hazard function B(λ) shall not exceed the levels defined by:	see table 4.2	N/A
	$E_B \cdot t = \sum_{300}^{700} \sum_{t} E_\lambda(\lambda,t) \cdot B(\lambda) \cdot \Delta t \cdot \Delta\lambda \le 100$ $J \cdot m^{-2}$	for t ≤ 100 s	N/A
	$E_B = \sum_{300}^{700} E_\lambda \cdot B(\lambda) \cdot \Delta\lambda \le 1$ $W \cdot m^{-2}$	for t > 100 s	N/A
4.3.5	Retinal thermal hazard exposure limit		P
	To protect against retinal thermal injury, the integrated spectral radiance of the light source, L_λ, weighted by the burn hazard weighting function R(λ) (from Figure 4.2 and Table 4.2), i.e., the burn hazard weighted radiance, shall not exceed the levels defined by:		P
	$L_R = \sum_{380}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{50\,000}{\alpha \cdot t^{0,25}}$ $W \cdot m^{-2} \cdot sr^{-1}$	(10 µs ≤ t ≤ 10 s)	P
4.3.6	Retinal thermal hazard exposure limit – weak visual stimulus		P
	For an infrared heat lamp or any near-infrared source where a weak visual stimulus is inadequate to activate the aversion response, the near infrared (780 nm to 1400 nm) radiance, L_{IR}, as viewed by the eye for exposure times greater than 10 s shall be limited to:		P
	$L_{IR} = \sum_{780}^{1400} L_\lambda \cdot R(\lambda) \cdot \Delta\lambda \le \frac{6\,000}{\alpha}$ $W \cdot m^{-2} \cdot sr^{-1}$	t > 10 s	P
4.3.7	Infrared radiation hazard exposure limits for the eye		P
	The avoid thermal injury of the cornea and possible delayed effects upon the lens of the eye (cataractogenesis), ocular exposure to infrared radiation, E_{IR}, over the wavelength range 780 nm to 3000 nm, for times less than 1000 s, shall not exceed:		P
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \le 18\,000 \cdot t^{-0,75}$ $W \cdot m^{-2}$	t ≤ 1000 s	N/A
	For times greater than 1000 s the limit becomes:		P
	$E_{IR} = \sum_{780}^{3\,000} E_\lambda \cdot \Delta\lambda \le 100$ $W \cdot m^{-2}$	t > 1000 s	P
4.3.8	Thermal hazard exposure limit for the skin		P
	Visible and infrared radiant exposure (380 nm to 3000 nm) of the skin shall be limited to:		P

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Clause	Requirement + Test	Result – Remark	Verdict
	$E_H \cdot t = \sum_{380}^{3\,000} \sum_{t} E_\lambda(\lambda,t) \cdot \Delta t \cdot \Delta\lambda \le 20\,000 \cdot t^{0,25}$ J · m^{-2}		P
5	**MEASUREMENT OF LAMPS AND LAMP SYSTEMS**		**P**
5.1	Measurement conditions		P
	Measurement conditions shall be reported as part of the evaluation against the exposure limits and the assignment of risk classification.		P
5.1.1	Lamp ageing (seasoning)		P
	Seasoning of lamps shall be done as stated in the appropriate IEC lamp standard.		P
5.1.2	Test environment		P
	For specific test conditions, see the appropriate IEC lamp standard or in absence of such standards, the appropriate national standards or manufacturer's recommendations.		P
5.1.3	Extraneous radiation		N/A
	Careful checks should be made to ensure that extraneous sources of radiation and reflections do not add significantly to the measurement results.		N/A
5.1.4	Lamp operation		P
	Operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC lamp standard, or		P
	– the manufacturer' s recommendation		N/A
5.1.5	Lamp system operation		P
	The power source for operation of the test lamp shall be provided in accordance with:		P
	– the appropriate IEC standard, or		P
	– the manufacturer' s recommendation		P
5.2	Measurement procedure		P
5.2.1	Irradiance measurements		P
	Minimum aperture diameter 7mm.		P
	Maximum aperture diameter 50 mm.		P
	The measurement shall be made in that position of the beam giving the maximum reading.		P
	The measurement instrument is adequate calibrated.		P
5.2.2	Radiance measurements		P
5.2.2.1	Standard method		P
	The measurements made with an optical system.		P
	The instrument shall be calibrated to read in absolute radiant power per unit receiving area and per unit solid angle to acceptance averaged over the field of view of the instrument.		P

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Clause	Requirement + Test	Result – Remark	Verdict
5.2.2.2	Alternative method		P
	Alternatively to an imaging radiance set-up, an irradiance measurement set-up with a circular field stop placed at the source can be used to perform radiance measurements.		P
5.2.3	Measurement of source size		N/A
	The determination of α, the angle subtended by a source, requires the determination of the 50% emission points of the source.		N/A
5.2.4	Pulse width measurement for pulsed sources		N/A
	The determination of Δt, the nominal pulse duration of a source, requires the determination of the time during which the emission is > 50% of its peak value.		N/A
5.3	Analysis methods		P
5.3.1	Weighting curve interpolations		P
	To standardize interpolated values, use linear interpolation on the log of given values to obtain intermediate points at the wavelength intervals desired.	see table 4.1	P
5.3.2	Calculations		P
	The calculation of source hazard values shall be performed by weighting the spectral scan by the appropriate function and calculating the total weighted energy.		P
5.3.3	Measurement uncertainty		P
	The quality of all measurement results must be quantified by an analysis of the uncertainty.	see Annex C in the norm	P
6	**LAMP CLASSIFICATION**		**P**
	For the purposes of this standard it was decided that the values shall be reported as follows:	see table 6.1	P
	– for lamps intended for general lighting service, the hazard values shall be reported as either irradiance or radiance values at a distance which produces an illuminance of 500 lux, but not at a distance less than 200 mm		P
	– for all other light sources, including pulsed lamp sources, the hazard values shall be reported at a distance of 200 mm		N/A
6.1	Continuous wave lamps		P
6.1.1	Except Group		N/A
	In the except group are lamps, which does not pose any photobiological hazard. The requirement is met by any lamp that does not pose:		P
	– an actinic ultraviolet hazard (E_S) within 8-hours exposure (30000 s), nor		P
	– a near-UV hazard (E_{UVA}) within 1000 s, (about 16 min), nor		P

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Clause	Requirement + Test	Result – Remark	Verdict
	– a retinal blue-light hazard (L_B) within 10000 s (about 2,8 h), nor		N/A
	– a retinal thermal hazard (L_R) within 10 s, nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 1000 s		P
6.1.2	Risk Group 1 (Low-Risk)		P
	In this group are lamps, which exceeds the limits for the except group but that does not pose:		N/A
	– an actinic ultraviolet hazard (E_S) within 10000 s, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 300 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 100 s, nor		P
	– a retinal thermal hazard (L_R) within 10 s, nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 100 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 100 s are in Risk Group 1.		N/A
6.1.3	Risk Group 2 (Moderate-Risk)		N/A
	This requirement is met by any lamp that exceeds the limits for Risk Group 1, but that does not pose:		N/A
	– an actinic ultraviolet hazard (E_S) within 1000 s exposure, nor		N/A
	– a near ultraviolet hazard (E_{UVA}) within 100 s, nor		N/A
	– a retinal blue-light hazard (L_B) within 0,25 s (aversion response), nor		N/A
	– a retinal thermal hazard (L_R) within 0,25 s (aversion response), nor		N/A
	– an infrared radiation hazard for the eye (E_{IR}) within 10 s		N/A
	Lamps that emit infrared radiation without a strong visual stimulus and do not pose a near-infrared retinal hazard (L_{IR}), within 10 s are in Risk Group 2.		N/A
6.1.4	Risk Group 3 (High-Risk)		N/A
	Lamps which exceed the limits for Risk Group 2 are in Group 3.		N/A
6.2	Pulsed lamps		N/A
	Pulse lamp criteria shall apply to a single pulse and to any group of pulses within 0,25 s.		N/A
	A pulsed lamp shall be evaluated at the highest nominal energy loading as specified by the manufacturer.		N/A
	The risk group determination of the lamp being tested shall be made as follows:		N/A

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Clause	Requirement + Test	Result – Remark	Verdict
	– a lamp that exceeds the exposure limit shall be classified as belonging to Risk Group 3 (High-Risk)		N/A
	– for single pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance does is below the EL shall be classified as belonging to the Exempt Group		N/A
	– for repetitively pulsed lamps, a lamp whose weighted radiant exposure or weighted radiance dose is below the EL, shall be evaluated using the continuous wave risk criteria discussed in clause 6.1, using time averaged values of the pulsed emission		N/A

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Clause	Requirement + Test	Result – Remark	Verdict

Table 4.1	Spectral weighting function for assessing ultraviolet hazards for skin and eye		P
Wavelength[1] λ, nm	**UV hazard function $S_{UV}(\lambda)$**	**Wavelength λ, nm**	**UV hazard function $S_{UV}(\lambda)$**
200	0,030	313*	0,006
205	0,051	315	0,003
210	0,075	316	0,0024
215	0,095	317	0,0020
220	0,120	318	0,0016
225	0,150	319	0,0012
230	0,190	320	0,0010
235	0,240	322	0,00067
240	0,300	323	0,00054
245	0,360	325	0,00050
250	0,430	328	0,00044
254*	0,500	330	0,00041
255	0,520	333*	0,00037
260	0,650	335	0,00034
265	0,810	340	0,00028
270	1,000	345	0,00024
275	0,960	350	0,00020
280*	0,880	355	0,00016
285	0,770	360	0,00013
290	0,640	365*	0,00011
295	0,540	370	0,000093
297*	0,460	375	0,000077
300	0,300	380	0,000064
303*	0,120	385	0,000053
305	0,060	390	0,000044
308	0,026	395	0,000036
310	0,015	400	0,000030

[1] Wavelengths chosen are representative: other values should be obtained by logarithmic interpolation at intermediate wavelengths.
* Emission lines of a mercury discharge spectrum.

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Clause	Requirement + Test	Result – Remark	Verdict

Table 4.2	Spectral weighting functions for assessing retinal hazards from broadband optical sources	P

Wavelength nm	**Blue-light hazard function B (λ)**	**Burn hazard function R (λ)**
300	0,01	
305	0,01	
310	0,01	
315	0,01	
320	0,01	
325	0,01	
330	0,01	
335	0,01	
340	0,01	
345	0,01	
350	0,01	
355	0,01	
360	0,01	
365	0,01	
370	0,01	
375	0,01	
380	0,01	0,1
385	0,013	0,13
390	0,025	0,25
395	0,05	0,5
400	0,10	1,0
405	0,20	2,0
410	0,40	4,0
415	0,80	8,0
420	0,90	9,0
425	0,95	9,5
430	0,98	9,8
435	1,00	10,0
440	1,00	10,0
445	0,97	9,7
450	0,94	9,4
455	0,90	9,0
460	0,80	8,0
465	0,70	7,0
470	0,62	6,2
475	0,55	5,5
480	0,45	4,5
485	0,40	4,0
490	0,22	2,2
495	0,16	1,6
500-600	$10^{[(450-\lambda)/50]}$	1,0
600-700	0,001	1,0
700-1050		$10^{[(700-\lambda)/500]}$
1050-1150		0,2
1150-1200		$0{,}2 \cdot 10^{0{,}02(1150-\lambda)}$
1200-1400		0,02

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Clause	Requirement + Test	Result – Remark	Verdict

Table 5.4	Summary of the ELs for the surface of the skin or cornea (irradiance based values)	P

Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Limiting aperture rad (deg)	EL in terms of constant irradiance $W \cdot m^{-2}$
Actinic UV skin & eye	$E_S = \sum E_\lambda \cdot S(\lambda) \cdot \Delta\lambda$	200 – 400	< 30000	1,4 (80)	30/t
Eye UV-A	$E_{UVA} = \sum E_\lambda \cdot \Delta\lambda$	315 – 400	≤1000 >1000	1,4 (80)	10000/t 10
Blue-light small source	$E_B = \sum E_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	≤100 >100	< 0,011	100/t 1,0
Eye IR	$E_{IR} = \sum E_\lambda \cdot \Delta\lambda$	780 –3000	≤1000 >1000	1,4 (80)	$18000/t^{0,75}$ 100
Skin thermal	$E_H = \sum E_\lambda \cdot \Delta\lambda$	380 – 3000	< 10	2π sr	$20000/t^{0,75}$

Table 5.5	Summary of the ELs for the retina (radiance based values)	P

Hazard Name	Relevant equation	Wavelength range nm	Exposure duration sec	Field of view radians	EL in terms of constant radiance $W \cdot m^{-2} \cdot sr^{-1}$)
Blue light	$L_B = \sum L_\lambda \cdot B(\lambda) \cdot \Delta\lambda$	300 – 700	0,25 – 10 10-100 100-10000 ≥ 10000	$0,011 \cdot \sqrt{(t/10)}$ 0,011 $0,0011 \cdot \sqrt{t}$ 0,1	$10^6/t$ $10^6/t$ $10^6/t$ 100
Retinal thermal	$L_R = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	380 – 1400	< 0,25 0,25 – 10	0,0017 $0,011 \cdot \sqrt{(t/10)}$	$50000/(\alpha \cdot t^{0,25})$ $50000/(\alpha \cdot t^{0,25})$
Retinal thermal (weak visual stimulus)	$L_{IR} = \sum L_\lambda \cdot R(\lambda) \cdot \Delta\lambda$	780 – 1400	> 10	0,011	6000/α

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

Table 6.1	Emission limits for risk groups of continuous wave lamps for model MSL-F300 with CCT. 6500K, (Risk Group 1) Measure distance 5585mm, α=0,0072rad									P
Risk	Action spectrum	Symbol	Units	Emission Measurement						
				Exempt		Low risk		Mod risk		
				Limit	Result	Limit	Result	Limit	Result	
Actinic UV	$S_{UV}(\lambda)$	E_S	$W \cdot m^{-2}$	0,001	3,8E-05	0,003	--	0,03	--	
Near UV		E_{UVA}	$W \cdot m^{-2}$	10	6,5E-05	33	--	100	--	
Blue light	B(λ)	L_B	$W \cdot m^{-2} \cdot sr^{-1}$	100	--	10000	--	4000000	--	
Blue light, small source	B(λ)	E_B	$W \cdot m^{-2}$	1,0*	--	1,0	3,89E-01	400	--	
Retinal thermal	R(λ)	L_R	$W \cdot m^{-2} \cdot sr^{-1}$	28000/α	2,7E+03	28000/α	--	71000/α	--	
Retinal thermal, weak visual stimulus**	R(λ)	L_{IR}	$W \cdot m^{-2} \cdot sr^{-1}$	6000/α	8,3E-01	6000/α	--	6000/α	--	
IR radiation, eye		E_{IR}	$W \cdot m^{-2}$	100	1,3E-03	570	--	3200	--	
* Small source defined as one with α < 0,011 radian. Averaging field of view at 10000 s is 0,1 radian. ** Involves evaluation of non-GLS source										

IEC 62471			
Clause	Requirement + Test	Result – Remark	Verdict

IEC62471B ATTACHMENT			
Clause	Requirement + Test	Result - Remark	Verdict
ATTACHMENT TO TEST REPORT IEC 62471 **EUROPEAN GROUP DIFFERENCES AND NATIONAL DIFFERENCES** Photobiological safety of lamps and lamps systems			
Differences according to ..... : EN 62471:2008			
TRF template used.....: IECEE OD-2020-F2:2020, Ed. 1.1			
Attachment Form No. ..... : EU_GD_IEC62471B **Attachment Originator.....** : OVE **Master Attachment**..... : Dated 2021-04-29			
	CENELEC COMMON MODIFICATIONS (EN)		P
4	**EXPOSURE LIMITS**		P
	Contents of the whole Clause 4 of IEC 62471:2006 moved into a new informative Annex ZB		—
	Clause 4 replaced by the following:		P
	The original Clause 4 of IEC 62471:2006 contains provisions governing limiting values for the exposure of persons falling within the area of the health and safety of workers. Within Europe those limiting values are already covered by the Artificial Optical Radiation Directive (2006/25/EC). Thus, the limits of the directive have to be applied instead of those fixed in IEC 62471:2006.		P
	There are no differences in EN 62471:2008 regarding the classification of lamps according Clause 6 of IEC 62471:2006.		—
4.1	General		P
	Delete the first paragraph.		—

Attachment 4: IEC 62262:2002+A1:2021 and IEC TR 62696:2011			
Clause	Requirement + Test	Result - Remark	Verdict

IEC 62262			
5	**General requirements for tests**		**P**
5.1	**Atmospheric conditions for tests**		P
	Unless otherwise specified in the relevant product standard, the test shall be carried out under the standard atmospheric conditions for tests described in IEC 60068-1:		P
	. temperature range: 15 °C to 35 °C, . air pressure: 86 kPa to 106 kPa (860 mbar to 1 060 mbar).		P
5.2	**Enclosures under test**		P
	Each enclosure under test shall be in a clean and new condition, complete with all its parts in place unless otherwise specified in the relevant product standard.		P
5.3	**Specifications to be given in the relevant product standard**		P
	The relevant product standard shall specify . the definition of "enclosure" as it applies to the particular type of equipment; . the test equipment (e.g. pendulum hammer, spring hammer or vertical hammer, see clause 7); . the number of samples to be tested; . the conditions for mounting, assembling and positioning the samples, e.g. by the use of an artificial surface (ceiling, floor or wall), in order to simulate intended service conditions as far as possible; . the pre-conditioning, if any, which is to be used; . whether to be tested energised; . whether to be tested with any moving parts in motion; . the number of impacts and their points of application (see 6.4).		P

6	**Test to verify the protection against mechanical impacts**		P
6.1	The test specified in this standard is a type test.		P
6.2	In order to verify the protection against mechanical impacts, blows shall be applied to the enclosure to be tested. The devices to be used for this test are described in clause 7.		P
6.3	During the test the enclosure shall be mounted on a rigid support, according to the manufacturers instructions for use. A support is considered to be sufficiently rigid if its displacement is less than or equal to 0,1 mm under the effect of an impact directly applied and whose energy corresponds to the degree of protection. Alternative mounting and support, suitable for the product, may be specified in the relevant product standard.		P

Attachment 4: IEC 62262:2002+A1:2021 and IEC TR 62696:2011			
Clause	Requirement + Test	Result - Remark	Verdict
6.4	The number of impacts shall be five on each exposed face unless otherwise specified in the relevant product standard. The impacts shall be evenly distributed on the faces of the enclosure(s) under test. In no case shall more than three impacts be applied in the surroundings of the same point of the enclosure. The relevant product standard shall specify the points of application of impacts.	See table 6.5	P
6.5	**Test evaluation**		P
	The relevant product standard shall specify the criteria upon which the acceptance or rejection of the enclosure is to be based, particularly - admissible damages, - verification criteria relative to the continuity of the safety and reliability of the equipment. In the absence of these criteria, at least the following acceptance criterion shall apply: - No damage is accepted that impairs the specified IP code.		P
7	**Test apparatus**		P
	The test shall be done by using one of the test apparatus described in IEC 60068-2-75. The relevant product standard shall specify which types of test apparatus are appropriate.	Vertical hammer	P

6.5	**Table: impact test**				P
Test model	location	Impact number of times	Impact energy (J)	Comments	
MSL-F300	Front surface (glass cover)	5	5	No crack, no hazards	
	Back surface of enclosure	5	5	No crack, no hazards	
	Side surface of enclosure	5	5	No crack, no hazards	

Attachment 4: IEC 62262:2002+A1:2021 and IEC TR 62696:2011			
Clause	Requirement + Test	Result - Remark	Verdict

IEC TR 62696			
3	**Conditions of testing**		**P**
3.1	In general, testing is conducted in accordance with IEC 62262, having regard to the general test conditions specified by IEC 60598-1, Subclause 4.13, and the following conditions which are specific for the IK testing and rating of luminaires.		P
3.2	Impacts should not be applied through openings in the luminaire enclosure with an area less than 64 cm².		P
3.3	**Luminaires should be tested fully assembled and installed for use.**		P
	Luminaires for ceiling or wall mounting should be mounted on a rigid wooden board.		N/A
	Suspended luminaires should be tested as in normal use, with the minimum suspension length detailed by the manufacturer's instructions.		N/A
	Luminaires to be installed on a pole, with or without a mast arm, should be installed on a rigid portion of the pole.		P
	Floor mounted luminaires should be tested in a suitable rigid structure to simulate normal use.		N/A
3.4	Luminaires should not to be energised during test and no preconditioning of the luminaire sample is required.		P
3.5	Testing should be conducted on a single luminaire sample unless the results of impact testing of other areas of the luminaire could influence assessment of the result. Three impact blows should be applied to the point(s) of the luminaire considered to be the weakest.		P
3.6	Impact testing should be conducted using striking elements with head radius and material type as specified by IEC 60068-2-75. Spring hammer apparatus should be used for ratings up to and including IK06. For ratings IK07 and above, the use of pendulum or vertical hammer apparatus is acceptable, as most appropriate for the luminaire design and its intended installation.	IK08, vertical hammer	P
3.7	Impact testing should be conducted with the luminaire in its intended mounting orientation whenever this is possible, and when this could affect the outcome of the test (e.g. for assessment of mounting surface fixing security). When impact testing of a ceiling-mounted luminaire is required from below the luminaire, and this is impractical, the luminaire may be rotated 90º (to a wall mounted position) for the purposes of this testing.		P
3.8	In cases where it may be impossible to carry out the impact test due to the luminaire construction, it is acceptable to use a specially-prepared luminaire to perform the test. For this situation, the modification should not impair the mechanical strength characteristics of the luminaire.		N/A

Attachment 4: IEC 62262:2002+A1:2021 and IEC TR 62696:2011			
Clause	Requirement + Test	Result - Remark	Verdict

IEC TR 62696			
4	**Conditions of acceptance**		P
4.1	Safety of the luminaire is to be maintained as per the criteria given in IEC 60598-1, Subclause 4.13. Furthermore, the fixings of the luminaire to the mounting surface should remain secure. Non safety critical damage to the luminaire enclosure and optics is accepted, but no parts of the luminaire should become detached.		P
4.2	Protection of the light source should be provided and basic functioning of the luminaire should be maintained.		P

Photo document

Figure 1: Front view of model MSL-F300

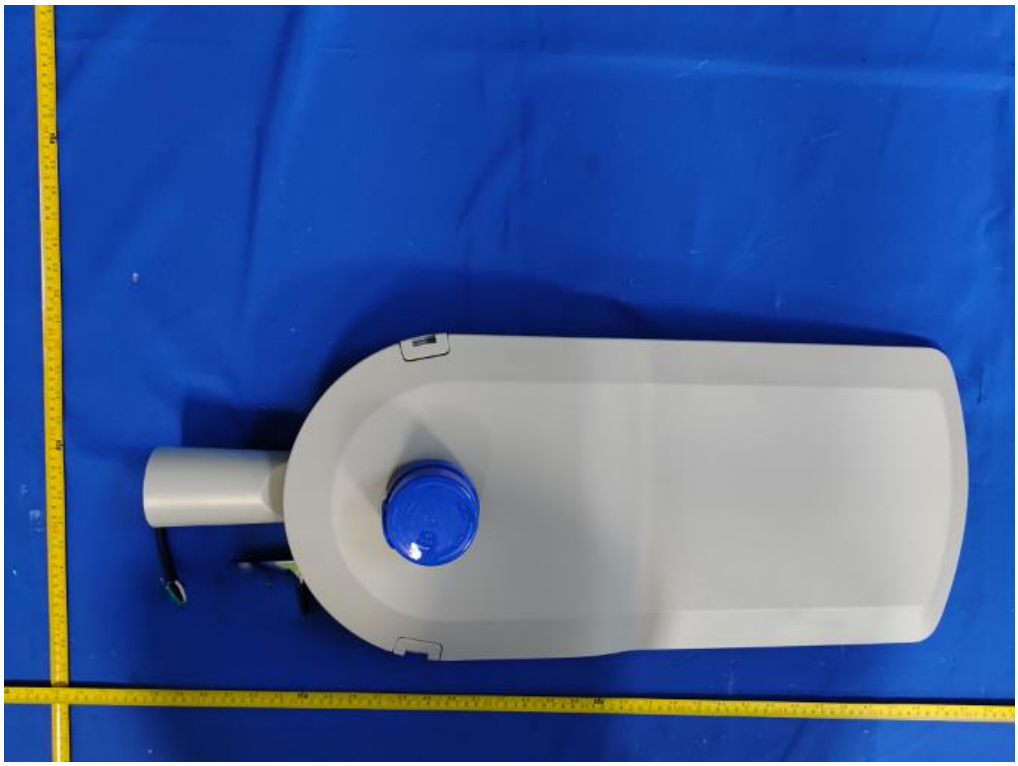

Figure 2: Base view of model MSL-F300

Photo document

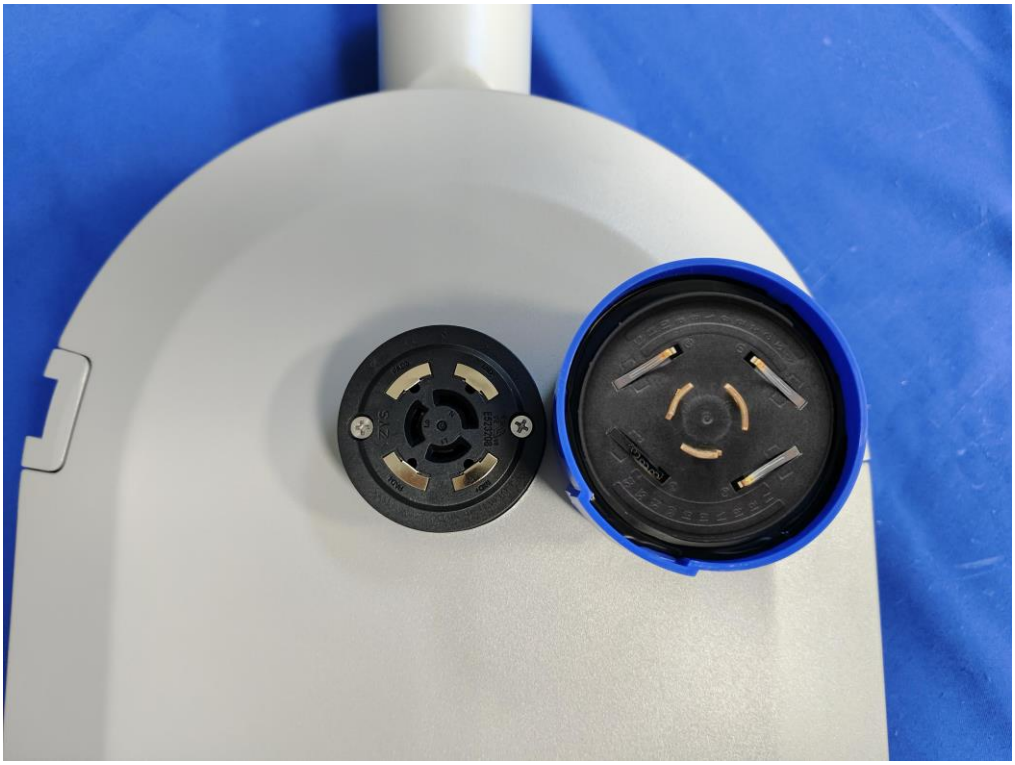

Figure 3: Internal view of model MSL-F300

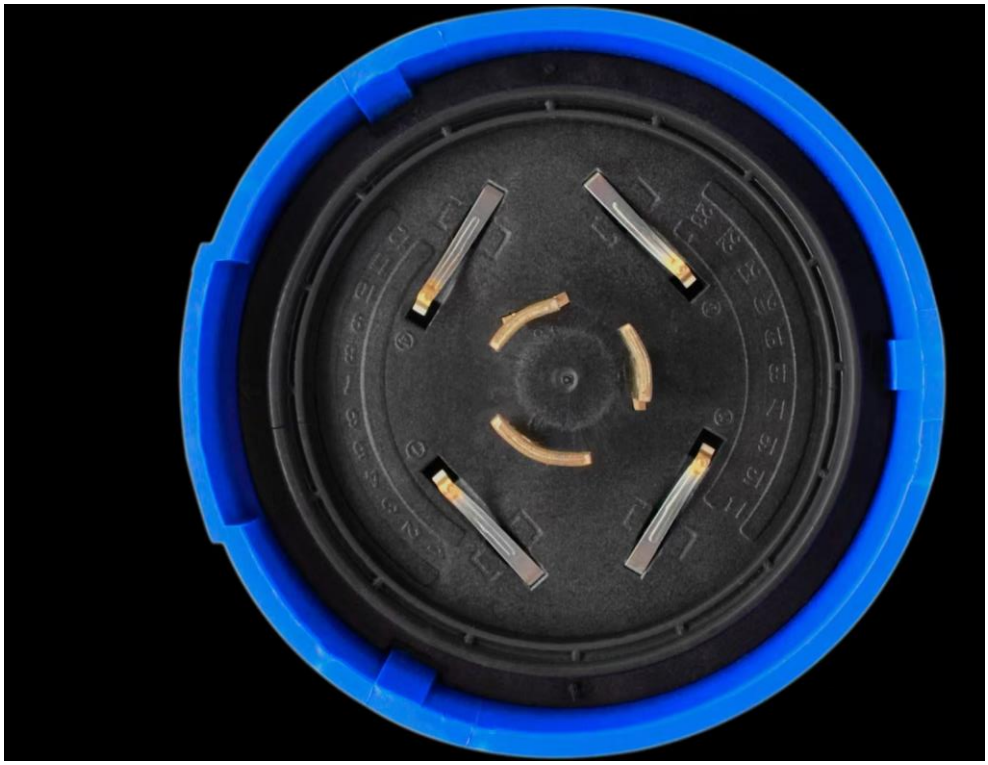

Figure 4: Internal view of model MSL-F300

Photo document

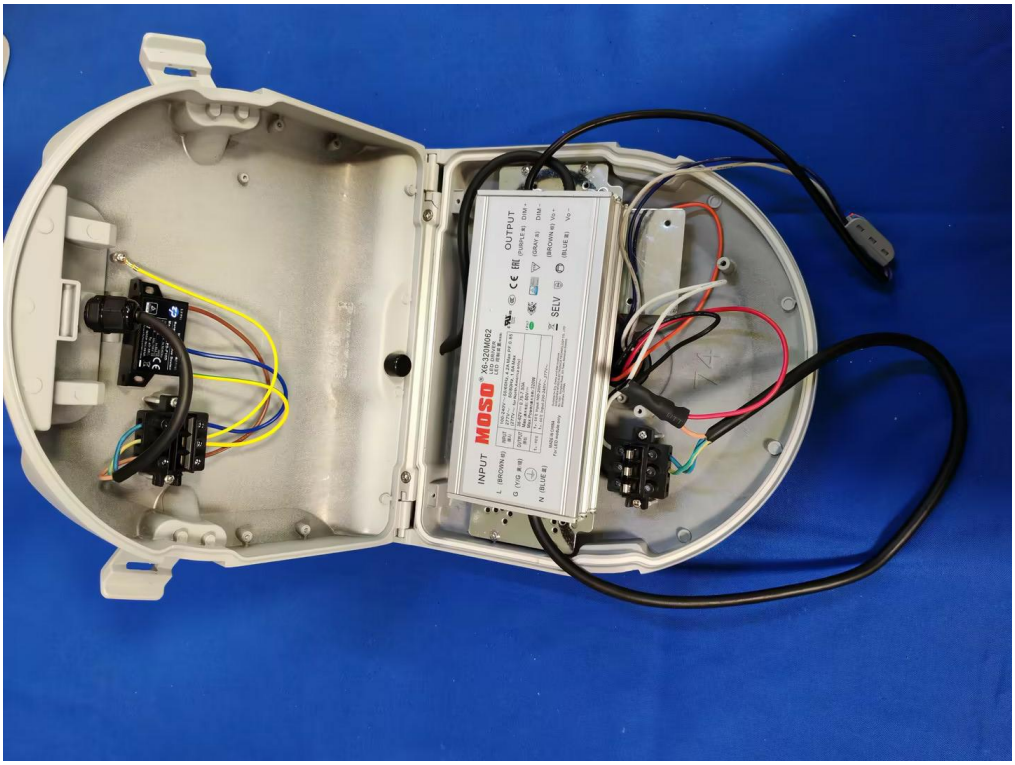

Figure 5: Internal view of model MSL-F300

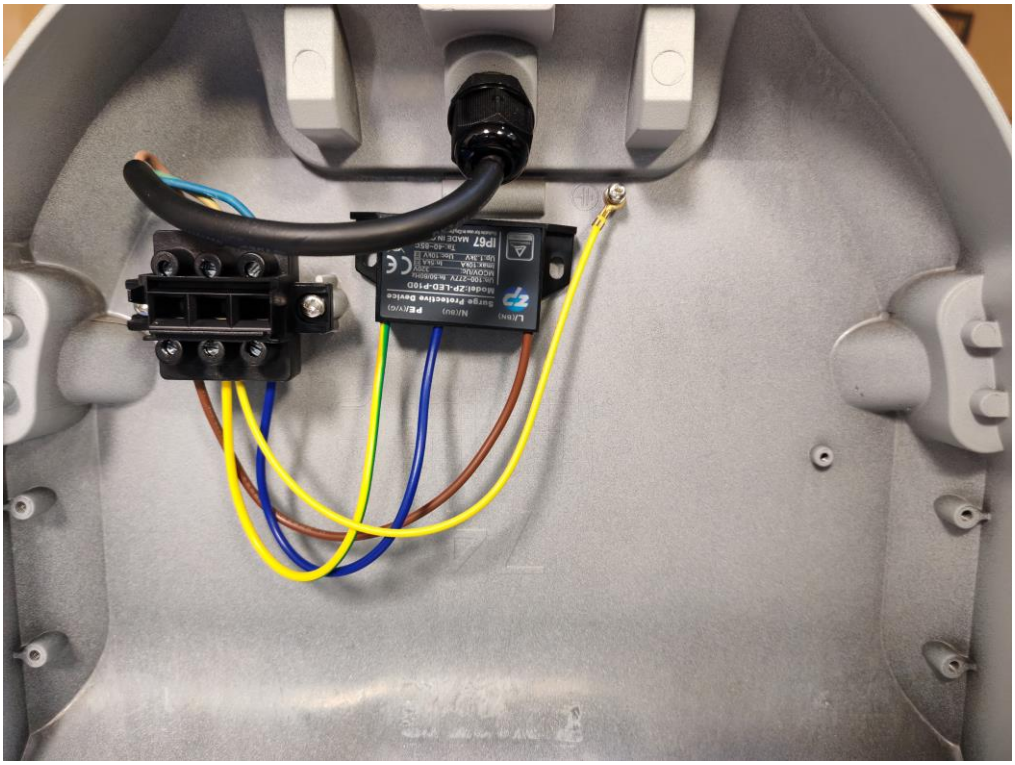

Figure 6: Internal view of model MSL-F300

Photo document

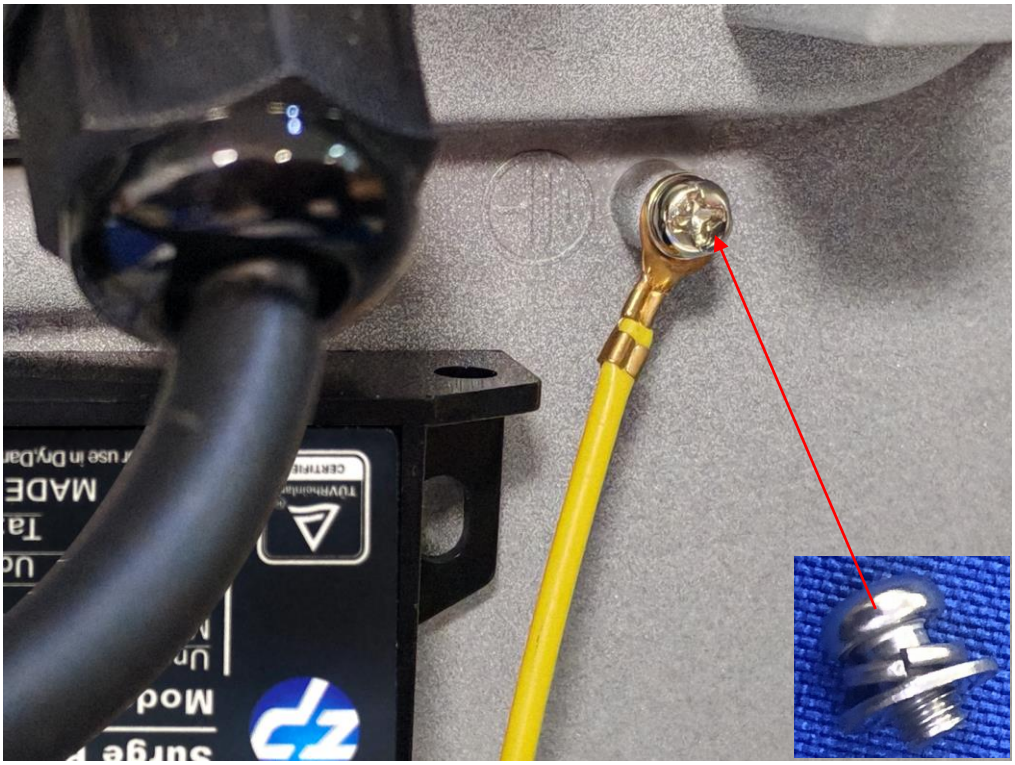

Figure 7: Earth view of model MSL-F300

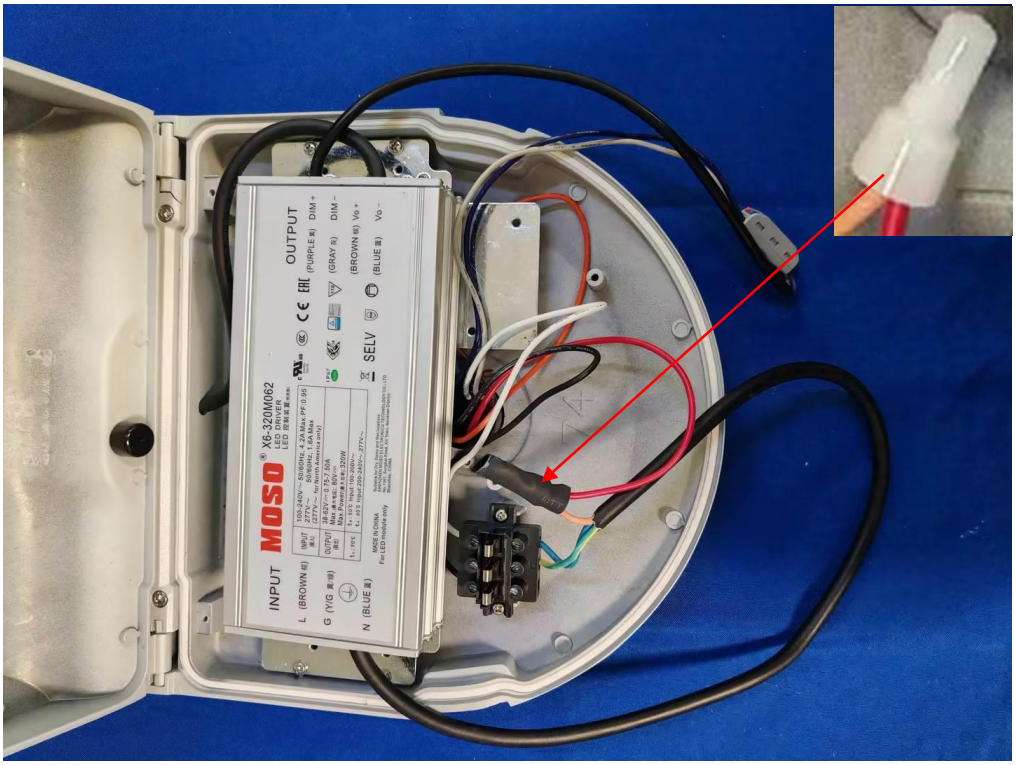

Figure 8: Internal view of model MSL-F300

Photo document

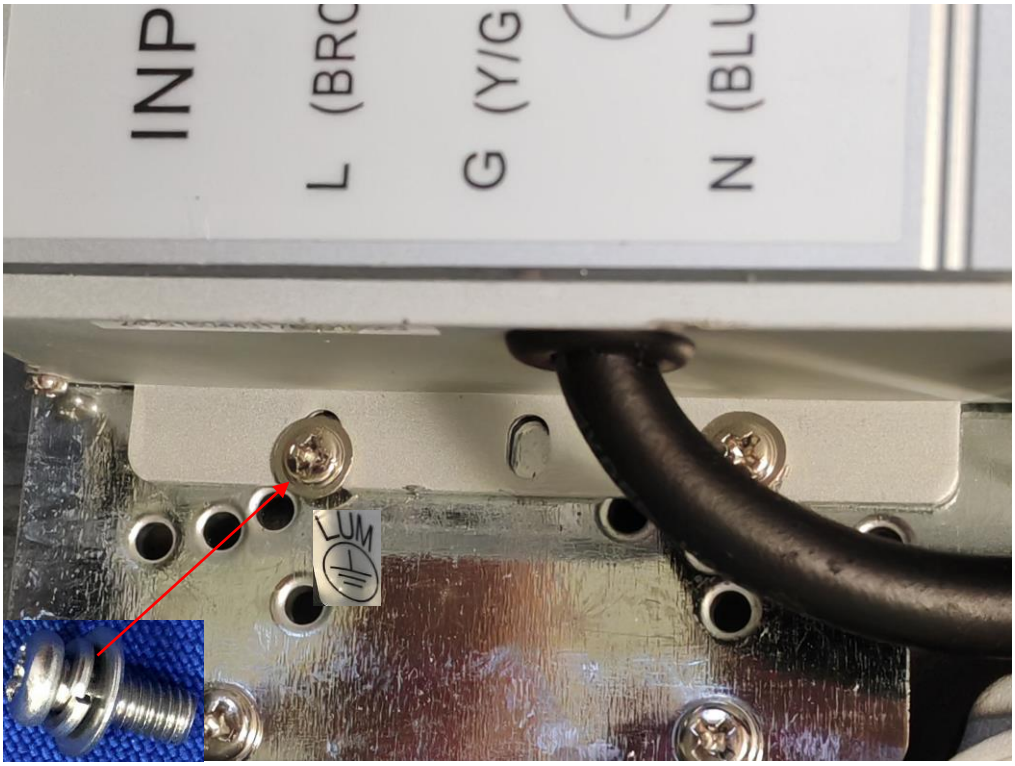

Figure 9: Earth view of model MSL-F300

Figure 10: Internal view of model MSL-F300

Photo document

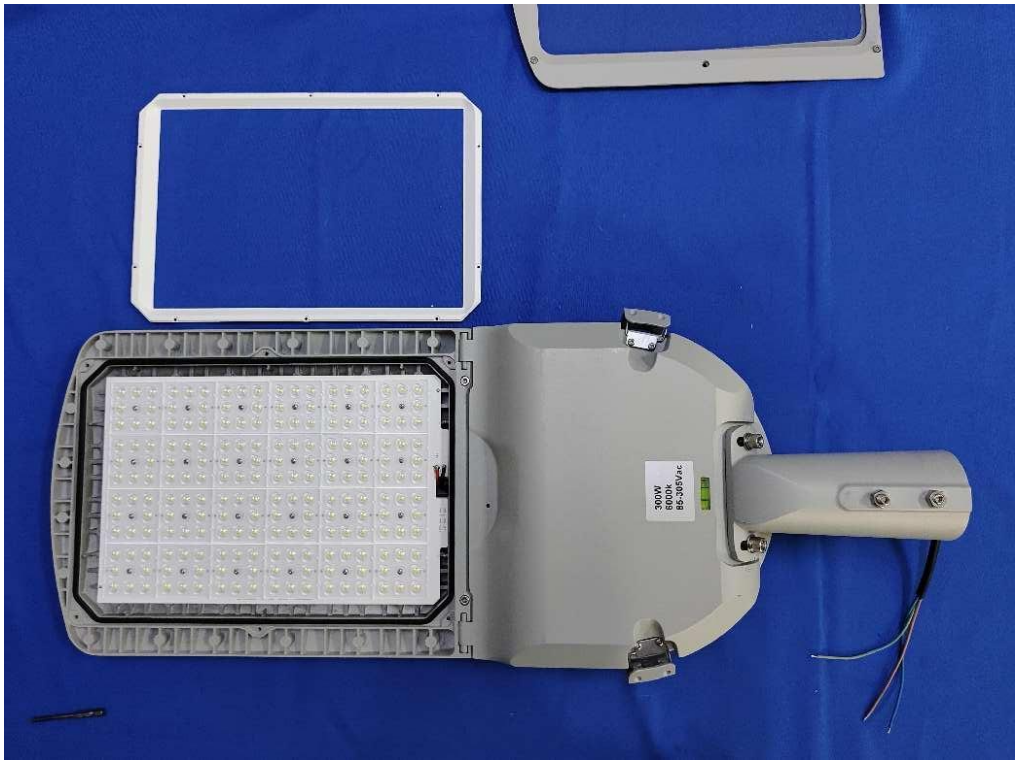

Figure 11: Internal view of model MSL-F300

Figure 12: LED module view of model MSL-F300

Photo document

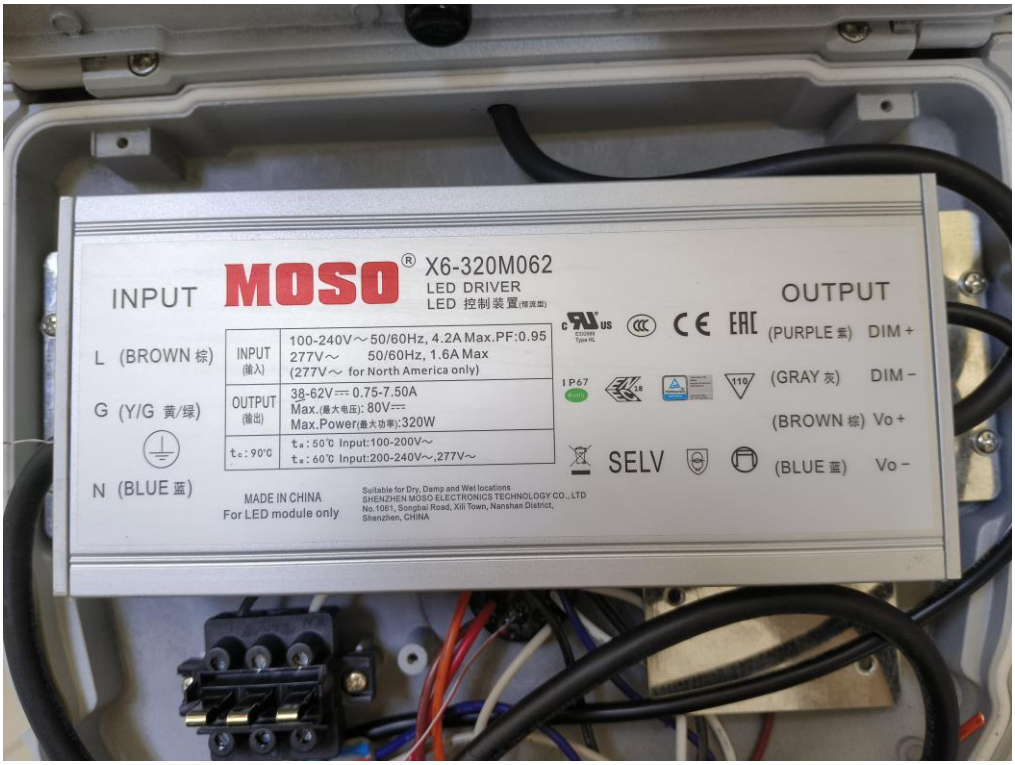

Figure 13: LED driver view of model X6-320M062

Figure 14: LED driver view of model X6-150M056-G

Photo document

Figure 15: LED driver view of model X6-075M056-G

Figure 16: Surge Protective Device view

- END OF REPORT -